This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

44 106 366 909

Fl
345
F31

HARVARD UNIVERSITY

LIBRARY

OF THE

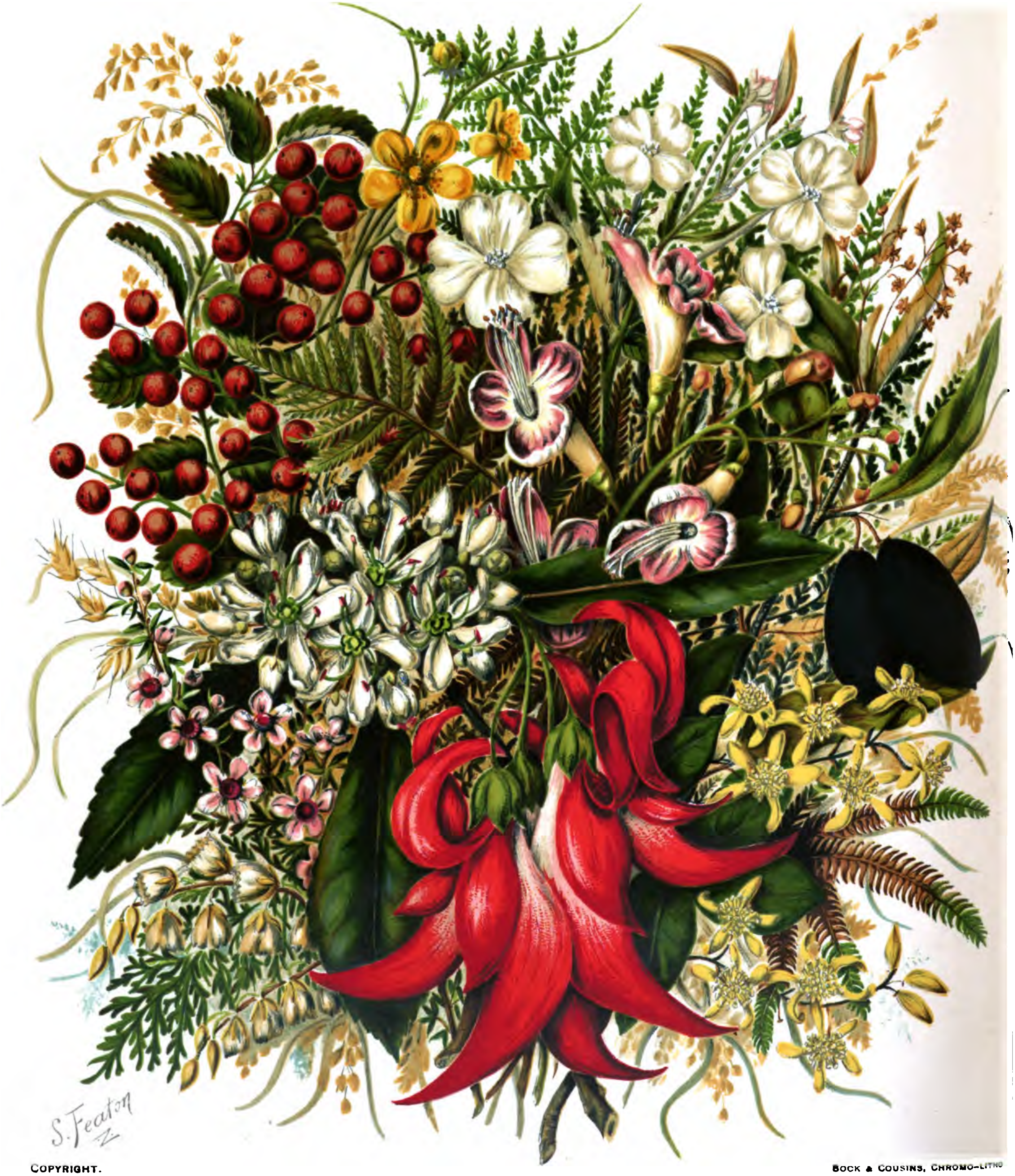
GRAY HERBARIUM

Francis Welles Hunnewell
Received
Bequest
November 1964

THE

ART ALBUM OF NEW ZEALAND FLORA.

1889.



COPYRIGHT.

BOCK & COUSINS, CHROMO-LITHO

WILD FLOWERS AND BERRIES.

THE

ART ALBUM

OF

NEW ZEALAND FLORA;

BEING

A SYSTEMATIC AND POPULAR DESCRIPTION
OF THE NATIVE FLOWERING PLANTS OF NEW ZEALAND AND THE
ADJACENT ISLANDS.

BY

MR. AND MRS. E. H. FEATON.

VOLUME I.

AUTHORS' EDITION.—ALL RIGHTS RESERVED.

Wellington, N.Z.:
PRINTED AND PUBLISHED AT THE OFFICE OF MESSRS. BOCK & COUSINS,
BRANDON STREET.
TRÜBNER & CO., LUDGATE HILL, LONDON, E.C.

1889.

F2
94.5
F31

PRINTED BY
BOCK & COUSINS,
BRANDON STREET,
WELLINGTON,
N.Z.

TO

His Excellency

SIR WILLIAM FRANCIS DRUMMOND JERVOIS, G.C.M.G., C.B.,

Governor and Commander-in-Chief of the Colony of New Zealand
and its dependencies;

~~WHO~~, ALIKE A DISTINGUISHED SOLDIER AND A LIBERAL PATRON
OF THE ARTS AND SCIENCES,

THIS

THE FIRST ARTISTIC & SCIENTIFIC WORK FROM THE NEW ZEALAND PRESS
IS GRATEFULLY DEDICATED

BY HIS EXCELLENCY'S OBEDIENT SERVANTS,

E. H. and S. FEATON.

Gisborne, N.Z.,
January, 1889.

PREFACE.

WHEN the publication of this work was first contemplated, it became a matter of earnest consideration as to the manner in which it should be issued, in order that it might be most serviceable to the student, and at the same time prove acceptable to the general public.

Two courses lay open to the authors, one comparatively easy and straightforward, the other intricate, and bristling with difficulties; or, in other words, the one method merely required that the authors should select a few of the best and most showy representatives of indigenous flowers from their portfolios, and publish them in a haphazard manner, with just a *soupgon* of descriptive matter to serve as a garnish; or, on the other hand, to accept the responsibility of putting forth a publication of a popular character based on scientific and systematic principles.

The authors chose the latter, but more arduous course, believing that in a work of such national importance, if worth doing at all, it was worth doing well, relying upon the intelligence and sound judgment of the public, to extend the necessary support, to enable them to carry out to completion, what had been so thoughtfully commenced.

In order to develop the full project, as arranged by the Authors, it is contemplated to continue this work by the issue of two further volumes (the material for which is largely in hand) so that the colony may be put in possession of a faithful and artistic epitome of the flowering plants of New Zealand, serviceable alike for the student and the artist, but the ultimatum of this enterprise rests on the measure of support afforded by our readers and the public.

It has been repeatedly asserted that there are no flowers in New Zealand, and by very many the statement is generally believed to be true.

The authors of this work deem it to be their privilege to prove how fallacious and incorrect such beliefs are.

The fact is, that New Zealand from her highest zone of verdure down to the littoral line, where the ocean "in varied mood sits enthroned," nothing lacks in indigenous flowering plants, more than nine hundred and fifty species of which have been classified.

It is true that the flowers of our adopted land cannot vie with the beauteous floral displays of more tropical climes, but, nevertheless, they display a beauty of form and character which in many instances are peculiarly their own. It is too often assumed, because flowers are not large and brilliant in colour, that they have no particular beauty and are devoid of interest, but this is quite a mistake, for who can deny that even the little Patch Plants, with their chaste inflorescence, clothing the rugged heights, and bordering on the region of perpetual snow, or the modest yellow-petalled Potentilla, that carpets the lowland plains, are not equally as worthy of regard and admiration, to all lovers of the beautiful, as their more luxurious and gaudy sisters, that bloom beneath the balmy influence of a more sunny clime.

A singularity in the New Zealand flora is its diversity of character and species, ranging from plants of established Antarctic origin, to those from the confines of the Torrid Zone, the progenitors of which have in times long past been carried hither by the warm currents of the ocean from the north, or deposited by the icebergs from the frozen seas of the south, or by process of immigration over a southern continent, or a chain of islands, which have long since sunk into the depths of the ocean.

High on the alps of the Middle Island, amidst the clouds and snow, we find the chaste and velvetty *Edelweiss*, the sweet-scented *Notothlaspi*, and the little *Hectorella*. Upon a lower zone the beautiful *Celmisias* with their well-clad shaggy foliage and conspicuous aster-like flowers, adorn the plateaux—lower still the sub-alpine Beeches with the luxuriant flowering *Tawari*, and the handsome *Hoheria*, break the dark lines of the primeval forest, and lower again stately trees, handsome flowering shrubs, trembling ferns, springy mosses, and hoary lichens clothe the landscape, down to the plains below, where the luxuriant tropical Nikau Palm, and the quaint *Cordyline* strike their roots deep into the soil. Such is a faint picture of our island flora.

The authors gratefully acknowledge the kind assistance rendered them by several of our most eminent New Zealand Botanists, particularly so are they indebted to Professor T. Kirk, F.L.S., of Wellington, late Chief Conservator of State Forests, W. Colenso, Esq., F.L.S., of Napier, President of the Hawke Bay Philosophical Society, J. Buchanan, Esq., F.L.S., late Geological Department, for sound advice, or for specimens, as well as for information collated from their published writings, also to Archdeacon W. L. Williams of Gisborne, and C. Traill, Esq., of Stewart Island, for many rare and valuable specimens, and to all for their kindly encouragement during the long progress of the work.

They are likewise indebted for the valuable help afforded them by the following gentlemen towards perfecting the "Art Album," viz., Messrs. Adams and Sons, Nurserymen of Christchurch, Mr. J. Dall, Botanical Collector of Collingwood, Mr. C. T. Wren, Nurseryman, of Auckland, and Mr. G. Cox of the Bay of Islands, besides several other ladies and gentlemen too numerous to mention individually, who by suggestions and floral offerings, aided the authors to bridge over many difficulties which otherwise were insurmountable, thereby tending to promote the interest and utility of this publication.

To the Press of the Colony the authors lie under a deep sense of obligation, for its unsolicited testimony as to the merits of the "Art Album," and in reply may simply state that if they have succeeded in pleasing, that they have, from the very first, been led by only one idea, and that was, to make their work as thorough as possible.

To our Printers, the Authors feel that more than an ordinary meed of praise is due for the very clear and able manner in which they have interpreted their ideas proving conclusively that New Zealand is not behindhand in the production of the highest class of chromo-lithographic work, and that the possibility of competing with the older countries in the issue of works of excellence is more than assured.

2338 **Featon (Mr. and Mrs. E. H.) The Art Album of New Zealand Flora,** being a systematic and popular description of the native flowering plants of New Zealand and the adjacent islands, Vol. 1, pp. xviii, 180, with coloured frontispiece and 39 coloured plates. 4to original half calf (neatly repaired). Wellin

In conclusion, the authors express a hope that their labours may tend to make many friends to help conserve our beautiful native flora, and that the information and portraiture contained in these pages may be the means of arousing a love of the beautiful in the breasts of many, who heretofore have looked upon the handiwork of the Creator with "a vacant eye," or in heedless indifference. It only remains for the authors to apologise for the imperfections that may be found in this work, by the more competent authorities, and they would ask that they may be leniently considered. At the same time the authors would deem it a great kindness if such imperfections were pointed out to them, so that they may be corrected in any future edition.

E. H. and S. F.

Gisborne, 1st November, 1888.

FRONTISPIECE.

THE beautiful plate of wild flowers and fruit which adorns this work is deserving of a few remarks, illustrating as it does a fair sample of the many and varied floral gems that enrich the forest glens and open glades of this our adopted home. It likewise exemplifies how much, with "art arranged" the small nothings, which escape the eye of the casual observer, may be brought together and blended into one harmonious whole to please the taste of the artistic mind and charm the most inappreciative of beholders. For the benefit of our readers we may mention that the following plants figure in the plate. On the top right-hand corner we have the chaste *Epilobium pallidiflorum* from its marshy home, reposing on a background of that beautiful fern *Pteris scaberula.* Immediately underneath is the strange but pretty pink and white blossom of the *Vitex littoralis* (Puriri), with its long tubular calyx and longer stamens, peeping out from a mass of *Cyathea.* On the top left-hand corner the bright-red berries of the *Rhipogonum scandens* (Supplejack) are temptingly displayed, close neighbour to the golden-petalled *Potentilla*, with its rose-like, green and silvery leaflets. A description of this pretty little plant will be found on page 122. In the foreground to the left appears the ornate blossoms of that elegant sub-alpine tree, *Ixerba brexioides* (Tawari), with its long attractive lanceolate foliage, beneath which the Pink Manuka puts forth a claim for recognition, in company with the pendant inflorescence of *Elæocarpus dentatus* (Hinau) overlying a frond of the delicate fern *Hymenophyllum scabrum*, and native grasses. On the right we have the foliage and fruit of the Tawa (*Nesodaphne Tawa*) temptingly hung, with its insignificant flowers disposed in panicles above; beneath, the beautiful *Clematis parviflora* with pale creamy flowers and dark-green foliage overlies a bed of *Lycopodium.* For a description of this little Clematis, see page 4. In the immediate centre the *Clianthus puniceus* (Kowhai-ngutu-kaka) stands out in all the glory of its crimson blossoms, the most unique and interesting member of our native flora, of which it is, in point of luxuriance and beauty, above all others in comparison. The name of "Glory Pea" is well fitted for so gorgeous a plant.

CONTENTS.

CHAPTER I.

RANUNCULACEÆ:—

GENUS. PAGE.
I. Clematis—The Clematis; Virgin Bower ... 2
II. Myosurus—The Mousetail ... 4
III. Ranunculus—The Crowfoot ... 5
IV. Caltha—The Marsh Marigold ... 9

CHAPTER II.

MAGNOLIACEÆ:—

I. Drimys—The Drimys; Pepper Tree ... 12

CHAPTER III.

CRUCIFERÆ:—

I. Nasturtium—The Watercress ... 16
II. Barbarea—The Herb of St. Barbara ... 17
III. Sisymbrium—The Mountain Cress ... 18
IV. Cardamine—The Bitter Cress ... 18
V. Braya—The Braya ... 20
VI. Lepidium—The Lepidium ... 21
VII. Notothlaspi—The Notothlaspi ... 22

CHAPTER IV.

VIOLARIEÆ:—

I. Viola—The Violet ... 25
II. Melicytus—The Honey Trees ... 27
III. Hymenanthera—The Hymenanthera ... 29

CHAPTER V.

PITTOSPOREÆ:—

I. Pittosporum—The Pittosporum ... 31

CHAPTER VI.

CARYOPHYLLEÆ:

GENUS. PAGE.
I. GYPSOPHILA—The Gypsophila 38
II. STELLARIA—The Star-worts 39
III. COLOBANTHUS—The Colobanthus 40
IV. SPERGULARIA—The Land Spurrey 42

CHAPTER VII.

PORTULACEÆ:—

I. CLAYTONIA—The Claytonia 43
II. MONTIA—The Montia 44
III. HECTORELLA—The Hectorella 45

CHAPTER VIII.

ELATINEÆ:—

I. ELATINE—The Water-worts 47

CHAPTER IX.

HYPERICINEÆ:—

I. HYPERICUM—The St. John's Herb 50

CHAPTER X.

MALVACEÆ:—

I. PLAGIANTHUS—The Plagianthus 52
II. HOHERIA—The Hoheria 55
III. HIBISCUS—The Hibiscus 56

CHAPTER XI.

TILIACEÆ:—

I. ENTELEA—The Entelea 60
II. ARISTOTELIA—The Aristotelia 61
III. ELŒOCARPUS—The Elœocarpus 63

CHAPTER XII.

LINEÆ:—

I. LINUM—The Flax 67

CHAPTER XIII.

GERANICEÆ:—

I. GERANIUM—The Crane's Bill 71
II. PELARGONIUM—The Pelargonium 74
III. OXALIS—The Wood Sorrel... 75

CHAPTER XIV.

RUTACEÆ:—

I. PHEBALIUM—The Phebalium 79
II. MELICOPE—The Melicope 80

CHAPTER XV.

MELIACEÆ:—

I. DYSOXYLUM—The Dysoxylum 83

CHAPTER XVI.

OLACINEŒ:—

GENUS. PAGE.
I. Pennantia—The Pennantia 85

CHAPTER XVII.

STACKHOUSIÆ:—

I. Stackhousia—The Stackhousia 87

CHAPTER XVIII.

RHAMNEÆ:—

I. Pomaderris—The Pomaderris 89
II. Discaria—The Discaria 93

CHAPTER XIX.

SAPINDACEŒ:—

I. Dodonæa—The Dodonœa 96
II. Alectryon—The Alectryon 97

CHAPTER XX.

ANACARDIACEŒ:—

I. Corynocarpus—The Corynocarpus 100

CHAPTER XXI.

CORIARIÆ:—

I. Coriaria—The Coriaria 103

CHAPTER XXII.

LEGUMINOSŒ:—

I. Carmichœlia—The Native Brooms 107
II. Notospartium—The Notospartium 113
III. Swainsonia—The Swainsonia 113
IV. Clianthus—The Clianthus 114
V. Sophora—The Sophora 116

CHAPTER XXIII.

ROSACEÆ:—

I. Rubus—The Bramble 119
II. Potentilla—The Cinque-foil 121
III. Geum—The Avens 123
IV. Acœna—The Acœna 124

CHAPTER XXIV.

SAXIFRAGEÆ:—

I. Donatia—The Donatia 129
II. Quintinia—The Quintinia 139
III. Ixerba—The Ixerba 132
IV. Carpodetus—The Carpodetus 133
V. Ackama—The Ackama 134
VI. Weinmannia—The Weinmannia 134

CHAPTER XXV.

CRASSULACEÆ:—

GENUS. PAGE.
I. Tillæa—The Tillæa 138

CHAPTER XXVI.

DROSERACEŒ:—

I. Drosera—The Sundews 141

CHAPTER XXVII.

HALORAGEŒ:—

I. Haloragis—The Haloragis 147
II. Myriophyllum—The Water-Milfoils 149
III. Gunnera—The Gunnera 151
IV. Callitriche—The Callitriche 152

CHAPTER XXVIII.

MYRTACEŒ:—

I. Leptospermum—The Leptospermum 155
II. Metrosideros—The Metrosideros 158
III. Myrtus—The Native Myrtles 166
IV. Eugenia—The Eugenia 168

List of Plates.

Plate I.

Fig. Page.
1. *Clematis indivisa*—Puawananga 2

Plate II.

1. *Clematis hexasepala*—Pikiarero 3

Plate III.

1. *Ranunculus Lyallii*—Shepherd's Lily ... 6

Plate IV.

1. *Ranunculus insignis*—Korikori 7

Plate V.

1. *Ranunculus plebius*—Native Buttercup ... 9
2. *Caltha Novæ Zelandiæ*—Native Caltha ... 10
3. *Drimys axillaris*—Axil-flowered Drimys ... 12

Plate VI.

1. *Cardamine hirsuta*—Hairy Cardamine ... 19
2. *Braya Novæ Zelandiæ*—Native Braya ... 20
3. *Lepidium incisum* –Cut-leaved Lepidium ... 22
4. *Notothlaspi rosulatum*—Rosette Notothlaspi 22
5. *Stellaria Roughii*—Captain Rough's Stellaria 40
6. *S. gracilenta*—Slender Stellaria 40
7. *Colobanthus acicularis*—Needle-pointed Colobanthus 41
8. *Spergularia rubra*–Pink-flowered Spergularia 42
9. *Claytonia Australasica* — Australian Claytonia 44
10. *Hectorella cæspitosa*—Tufted Hectorella ... 45

Plate VII.

1. *Viola filicaulis*—Native Violet 26
2. *Melicytus ramiflorus*—Hina-hina... ... 28

Plate VIII.

1. *Pittosporum tenuifolium*—Kowhiwhi ... 32
2. *P. crassifolium*—Karo 34

Plate IX.

Fig. Page.
1. *Pittosporum Eugenioides*—Tarata ... 35

Plate X.

1. *Pittosporum cornifolium*—Piripiri ... 36

Plate XI.

1. *Plagianthus divaricatus*—Branch-spreading Plagianthus 53
2. *P. Lyallii*—Hohere 54
3. *Hibiscus trionum*—Native Hibiscus ... 57

Plate XII.

1. *Hoheria populnea*—Houi 55

Plate XIII.

1. *Entelea arborescens*—Whau 60

Plate XIV.

1. *Aristotelia racemosa*—Mako-mako ... 62

Plate XV.

1. *Elæocarpus dentatus*—Hinau ... ...
2. *Linum monogynum*—Rauhuia 68

Plate XVI.

1. *Geranium dissectum*—Matuakumara ... 71
2. *G. Traversii*—Mr. Travers' Geranium ... 74
3. *Pelargonium Australe*—Kopata 75
4. *Oxalis corniculata*—Native Oxalis ... 76
5. *O. Magellanica*—Straits of Magellan Oxalis 77

Plate XVII.

1. *Phebalium nudum*—Mairehau 80
2. *Melicope ternata*—Wharangi 81

Plate XVIII.

1. *Dysoxylum spectabile*—Kohe-Kohe ...

Plate XIX.

1. *Pennantia corymbosa*—Kaikomako ... 86

PLATE XX.

Fig. Page.

1. *Pomaderris elliptica*—Kumarahou ... 90

PLATE XXI.

1. *Pomaderris*—New species 91
2. *P. phylicifolia*—Tauhinu 91
3. *Discaria toumatou*—Toumatou 93

PLATE XXII.

1. *Dodonea viscosa*—Ake Ake 96

PLATE XXIII.

1. *Alectryon excelsum*—Titoki 97

PLATE XXIV.

1. *Corynocarpus lævigata*—Karaka 100

PLATE XXV.

1. *Coriaria ruscifolia*—Tupakihi 103

PLATE XXVI.

1. *Carmichælia odorata*—Scented Broom ... 109
2. *C. flagelliformis*—Native Broom 110
3. *C. Williamsii*—Archdeacon Williams' Broom 112
4. *Notospartium Carmichælia*—Pink Broom ... 113

PLATE XXVII.

1. *Clianthus puniceus*—Kowhai-ngutu-Kaka ... 114

PLATE XXVIII.

1. *Sophora tetraptera*—Yellow Kowhai ... 117

PLATE XXIX.

1. *Rubus Australis*—Native Bramble ... 119
2. „ „ „ „ ... 119
3. *R. parva*—Small Bramble 120
4. *Geum urbanum*—Kopata 123
5. *Acæna sanguisorbæ*—Hutiwai 125

PLATE XXX.

1. *Quintinia serrata*—Native Lilac 131
2. *Carpodetus serratus*—Puta-puta-weta ... 133

PLATE XXXI.

Fig. Page.

1. *Ixerba brexioides*—Tawari 132

PLATE XXXII.

1. *Wienmannia silvicola*—Towai 135
2. *W. racemosa*—Tawhero... 136

PLATE XXXIII.

1. *Drosera Arcturi*—Alpine Sundew ... 142
2. *D. binata*—Strap-leaved Sundew ... 144
3. *D. auriculata*—Field Sundew 145
4. *Haloragis alata*—Toatoa 148

PLATE XXXIV.

1. *Leptospermum scoparium*—Teatree ... 156
2. *L. ericoides*—Manuka 157

PLATE XXXV.

1. *Metrosideros florida*—Florid Rata ... 158
2. *M. lucida*—Ironwood 159
3. *Metrosideros albiflora* — White-flowered Rata 160

PLATE XXXVI.

1. *Metrosideros robusta*—Rata 161
2. *M. scandens*—Climbing Rata 165
3. *M. Parkinsonii*—Mr. Parkinson's Rata ... 165

PLATE XXXVII.

1. *Metrosideros tomentosa*—Pohutukawa ... 163

PLATE XXXVIII.

1. *Myrtus bullata*—Rama-rama 166
2. *M. obcordata*—Rohutu 167
3. *M. pedunculata*—Rohutu 168

PLATE XXXIX.

1. *Eugenia maire*—Maire-tawhake 169

PLATE XL.

FRONTISPIECE—Wild Fruits and Flowers ...

The Art Album

OF

NEW ZEALAND FLORA.

CHAPTER I.

CLASS I.—DICOTYLEDONS.

ORDER I.—RANUNCULACEÆ. (The Crowfoot Family.)

CHARACTER OF THE ORDER.—Herbs with alternate or radical leaves (Clematis excepted). Flowers usually hermaphrodite. Sepals, 3–6, free, often petaloid, usually deciduous. Petals, 5–10 or none, sometimes spurred or deformed, often with a pit or scale towards the base, deciduous. Stamens hypogynous, usually very numerous; anthers adnate. Carpels numerous, free on a torus which sometimes elongates. Fruit of few, or many 1-seeded achenes, or many-seeded follicles; Seeds with fleshy albumen, and a minute embryo.—*Handbook of New Zealand Flora, p. 1.*

DESCRIPTION OF THE ORDER.—

ABOUNDING in all temperate climates, rarer in tropical. Many European and other genera have irregular flowers, and otherwise differ from the New Zealand types; such as the cultivated Aconite, Larkspur, Columbine, &c. The juice of the *Ranunculaceæ* is watery, and very acrid. All the species are more or less poisonous. The leaves are usually parted, and the petioles, or footstalks, generally dilated at the base, so as to enfold the stem; this is, indeed, so frequently the case, that when a plant is found to have this peculiarity, combined with numerous stamens growing round, and from beneath a little heap of carpels in the centre of the flower, the student in botany may be certain that the plant belongs to the *Ranunculaceæ*. There are, however, many plants belonging to the family which have neither cut leaves nor dilated petioles. The order takes its name from the genus Ranunculus. All the New Zealand genera, which consist of the following, are also British:—(1). CLEMATIS, climbing shrubs; (2). MYOSORUS, herb; (3). RANUNCULUS, herbs; (4). CALTHA, herb.

GENUS I.

CLEMATIS *(Linn.)* The Clematis or Virgin's Bower.

GENERIC CHARACTER.—Much branched, slender, climbing shrubs, with opposite compound leaves, and panicles of white or cream-coloured polygamous flowers; Sepals, 3–8, petaloid, valvate; Stamens, 5–20; Carpels many, 1-ovuled. Achenes indehiscent—the styles elongated into long feathered awns.—*Handbook of New Zealand Flora, p. 1.*

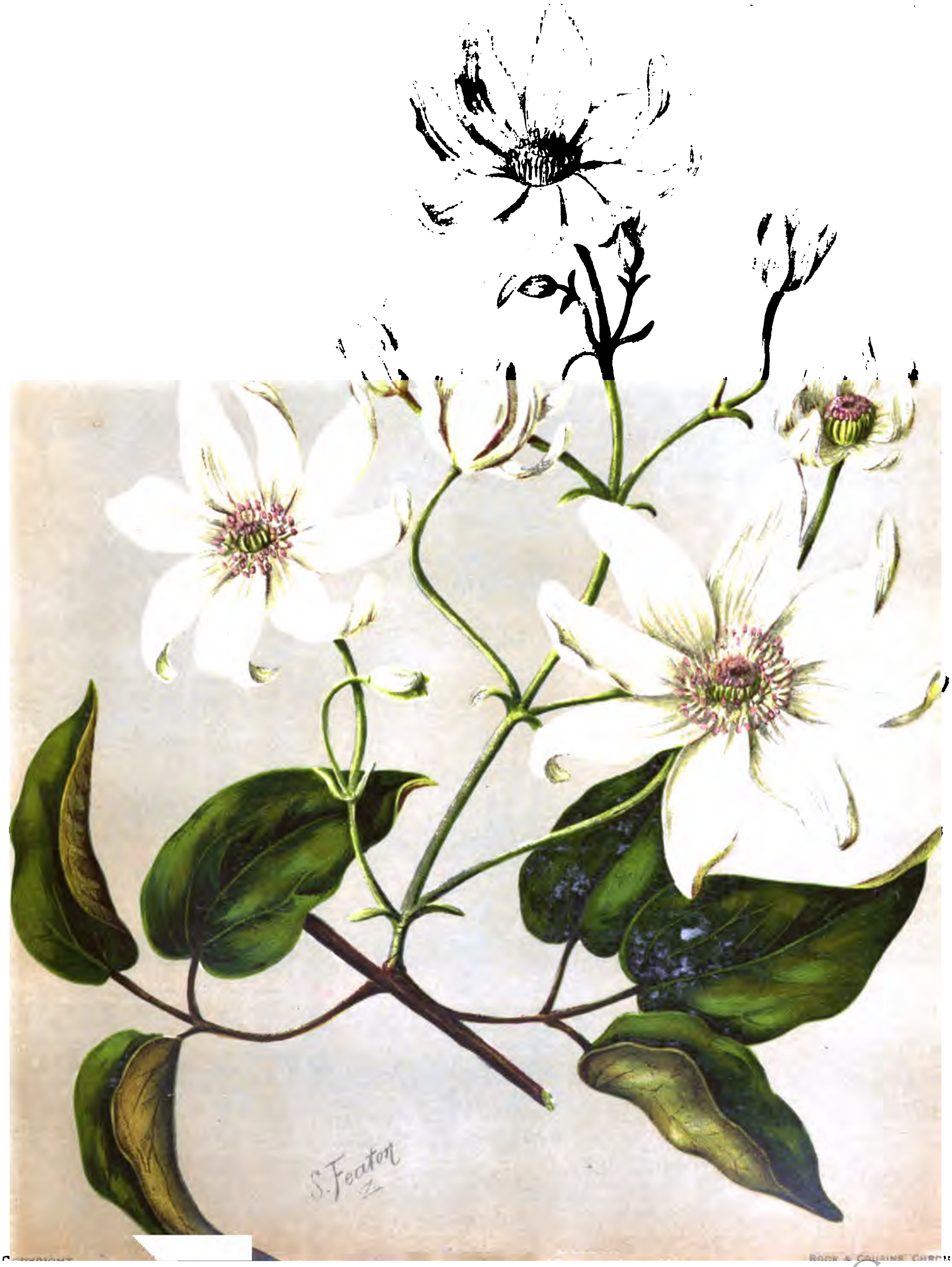
DESCRIPTION, etc.—A large and widely-diffused genus, of which many foreign species have blue or purple flowers, herbaceous, or erect stems, entire leaves, or minute petals. The New Zealand species are very variable, passing one into the other; their flowers are almost unisexual, the males having no carpels, and the females few stamens. The anthers have no appendage at the tip, as most of the Australian species have; *C. parviflora* alone having a very minute one.

The name "Clematis" which signifies "a little vine," alludes to the habit of growth of these species.

1. CLEMATIS INDIVISA *(Willd.)* The Entire-leaved Clematis.

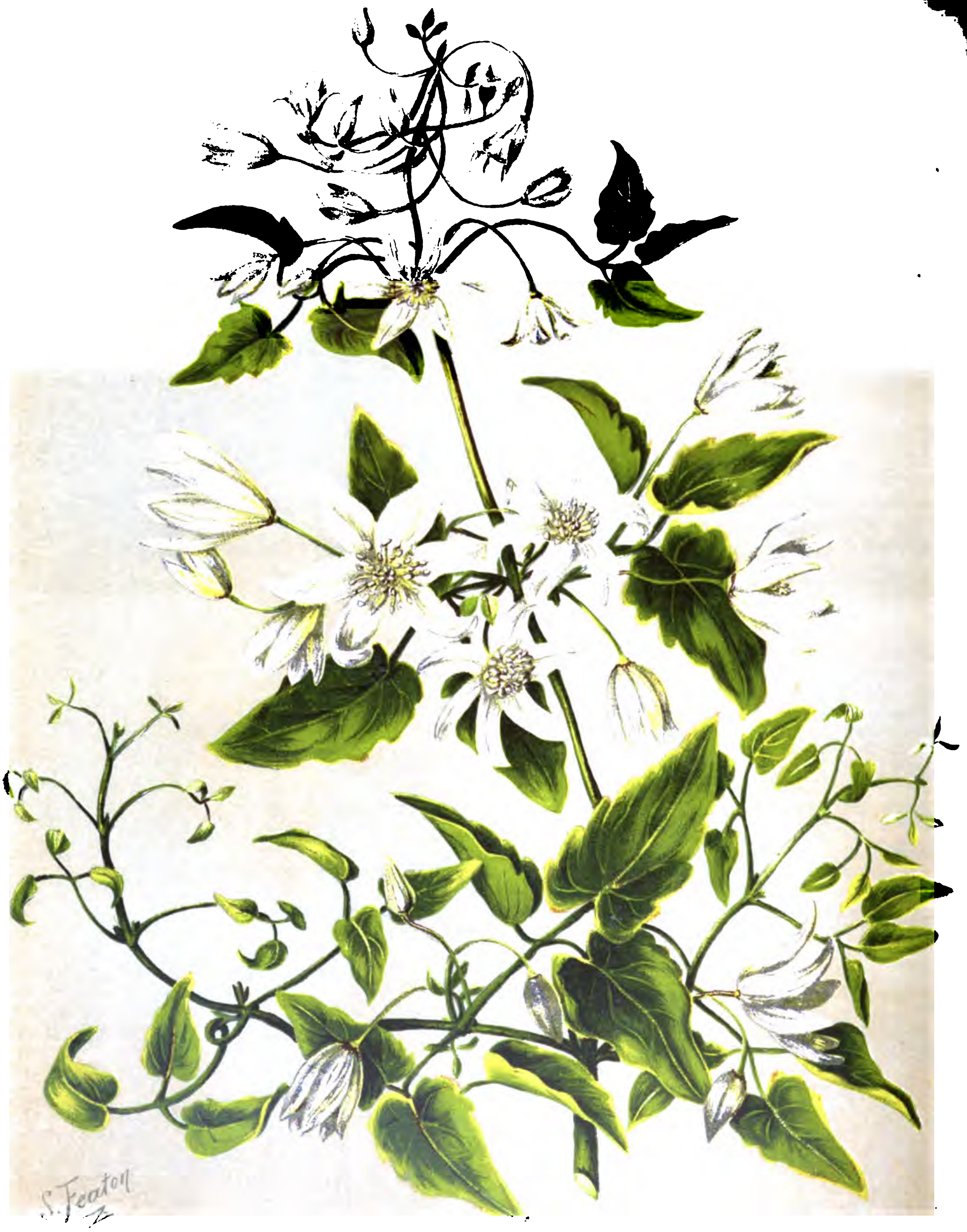
SPECIFIC CHARACTER.—A large, strong, woody-climber, with trunk often ½ ft. in diameter. Leaves, 3-foliolate, coriaceous, glabrous or downy; Leaflets, 1–4 in. long, varying from linear-oblong to ovate-cordate, all petioled, entire, rarely lobed. Flowers, 1–4 in. diameter; most abundantly produced; white, sweet-scented. Sepals, 6–8, broad or narrow-oblong. Anthers obtuse, oblong. Achenes very downy.—*Handbook of New Zealand Flora, p. 2.*

DESCRIPTION, etc., Plate No. 1.—The "PUAWANANGA."—This handsome plant is abundant in most districts throughout the Islands. It is found more especially on the skirts of inland forests, where it climbs the loftiest of trees, and garlands them with its chaste flowers and handsome foliage. It is the largest and choicest member of the family, and gladdens the Spring (month of October) with its presence. On account of its climbing habit, it is at times impossible to obtain its floral treasures, which, pendant from the highest branches of the stately forest trees, defy all attempts, at the hands of the coveteous ones below, to possess them. The flowers are remarkable for their size, whiteness, and elegance of form. Many of the European species are exquisitely pure and produce a long succession, and a great profusion of large, variously-coloured beautiful,



COPYRIGHT

BOCK & COUSINS CHROMO-LITHO



COPYRIGHT

BOCK & COUSINS. CHROMO-LITHO.

PIKIARERO.—Clematis hexasepala.

handsome flowers, which, trained to a trellis, or the wall of a conservatory, give an appearance at once effective and attractive. The Clematis can be propagated by grafting, cuttings, layering, or seed. The flowers of the European Clematis are hermaphrodite; that is, both the seed organs are contained in the same flower. In New Zealand, the flowers are almost unisexual, or of one sex only, the males having no carpels, and the females few stamens. The "Puawananga" has been successfully introduced into many colonists' gardens, where it has become a handsome and interesting addition, well repaying, by its presence, the trouble necessary in raising.

2. CLEMATIS HEXASEPALA *(D.C.)* The Six Sepal Clematis.

Specific Character.—Smaller in all parts than *C. indivisa*, and best distinguished by its smaller, narrow, ovate-cordate, often lobulate leaflets, small flowers, and very narrow anthers. Leaves glabrous, coriaceous; leaflets 1–1½ in. long, coriaceous, ovate-lanceolate, serrate, or lobulate, rarely entire. Peduncles pubescent. Flowers white, 1–2 in. diameter. Sepals 6, broadly linear, obtuse, downy. Anthers long, linear, obtuse. Achenes pilose.—*Handbook of New Zealand Flora, p. 2.*

Description, etc., Plate No. 2.—The "PIKIARERO."—This beautiful climber is common to both the Northern and Middle Islands, but more particularly delights in the sandy soils of the East Coast of the Northern Island, which might not be inaptly designated its home, as there, in the woods and along the banks of rivers, it is seen to perfection. It blossoms in the Spring, when its mass of beautiful flowers imparts a graceful and picturesque appearance to the landscape. In some parts it is known as the "Traveller's Joy," a name probably due to its appearance in early spring, as a harbinger of brighter weather and sunnier skies. On account of its attractive beauty, the "Pikiarero" has ever been an object of interest to the Maoris, who used it upon festive occasions as a means of personal adornment; particularly the native maidens, who bedecked their heads and ornamented themselves with its magnificent sprays, the pale, creamy flowers forming a charming contrast to the bronzed skin of the wearers.

> "Garlands of the graceful Pikiarero,
> Gathered in the early morning;
> Wreathed around their supple limbs;
> Symbol of their pure intentions,
> And the clinging of the human heart."

As an addition to our gardens, the graceful "Pikiarero" is well worthy of attention; and few enclosures are without a secluded corner, or a lattice, where it would be a worthy addition, as it is hardy, quick-growing and beautiful. If the young plants are transplanted in the autumn, there is no difficulty in obtaining a successful growth.

3. CLEMATIS FŒTIDA (*Raoul.*) The Fœtid Clematis.

Specific Character.—A slender climber. Leaves, 3-foliolate; leaflets ⅓–1 in. long, ovate-cordate, usually broad, sub-acute, entire or lobed, coriaceous, glabrous below. Panicle densely tomentose, as are the sepals. Flowers small—⅓–⅔ in. diameter; fœtid. Sepals 4–6, linear, filaments slender; anthers shortly linear-oblong. Achenes silky.—*Handbook of New Zealand Flora, p. 2.*

Description, etc.—This elegant slender climber is common to both the Northern and Middle Islands, growing abundantly on the outskirts of woods, where it clothes, with its luxurious foliage, the smaller trees and shrubs. When it is in flower, it presents a very chaste and beautiful appearance. Similarly to its larger confrère, the *C. hexasepala,* it is used by the native girls to adorn themselves with upon festive occasions. It blossoms in September and October, when it delights the eye of the traveller with its rich, canary-yellow flowers, and dark-green foliage, mantling the thicket and copse, as a tribute of returning spring. This humble climber, it is due to state, has been greatly mis-named; since it possesses a strong perfume, which is not at all unpleasant, and is considered to be its chief attraction.

OTHER SPECIES OF CLEMATIS.

4. C. PARVIFLORA (*A. Cunn.*)

A slender climber, more or less covered with fulvous pubescence. The flowers of this species are cream-coloured, and from ⅓ to 1 in. diam. It is abundant on the skirts of woods in the Northern Island, and a variety of it is found at Nelson.

5. C. COLENSOI (*Hook., F.*)

A slender climber. Flowers are small, green, and very sweet-scented. It is found in various parts of the Northern and Middle Islands. It is allied to *C. hexasepala,* from which it is easily distinguished by its smaller size and green flowers. Named after Mr. Colenso, F.L.S., one of our most able and indefatigable New Zealand botanists.

GENIUS II.

MYOSURUS (*Linn.*) The Mousetail.

Generic Character.—Small stemless annual herbs, with linear leaves, and many 1-flowered scapes; Sepals, 5, gibbous or tubular, or spurred at the base. Petals, none in the New Zealand species. Stamens, 5 or more. Carpels, 1-ovuled. Achenes small, beaked, sessile, and crowded on the torus, which elongates as they ripen.—*Handbook of New Zealand Flora, p. 3.*

Description, etc.—A small genus, native of the temperate Northern and Southern

Hemispheres. It is a very minute plant, and is well marked by having its seeds arranged on a long columnar receptacle, so as to produce a curious resemblance to a mouse's tail, hence its name.

1. MYOSURUS ARISTATUS (*Benth.*) The Bearded Mousetail.

Specific Character.—A herb about 1 in. high; Leaves 1-20th inch, broad; Flowers, minute, greenish, apetalous. Sepals with a spurred base; Stamens, 5 or 6. Fruiting torus, ¼–½ in. long, erect.—*Handbook of New Zealand Flora, p. 3.*

Description, etc.—This minute plant is a native of the Northern Island; it is also indigenous to California and the Andes of Chili, where it grows at an elevation of 11,500 feet. It is not found in Australia, where the European species takes its place. It is possibly the smallest flowering plant in New Zealand. *M. minimus*, the best-known European species, rarely attains more than three or four inches in height, and bears a few linear spathulate leaves, and leafless stalks, terminating in a small greenish flower. It grows most frequently among corn in a chalky or gravelly soil, but is often overlooked in consequence of its small size.

GENUS III.

RANUNCULUS (*Linn.*) The Crowfoot.

Generic Character.—Herbs with petioled radical leaves, and yellow, or white, flowers; Sepals, 3–5, concave; Petals, 5–20, with 1–3 glands, or scales near the base. Achenes numerous, small, with short, straight, or hooked styles, and one ascending ovule.—*Handbook of New Zealand Flora, p. 3.*

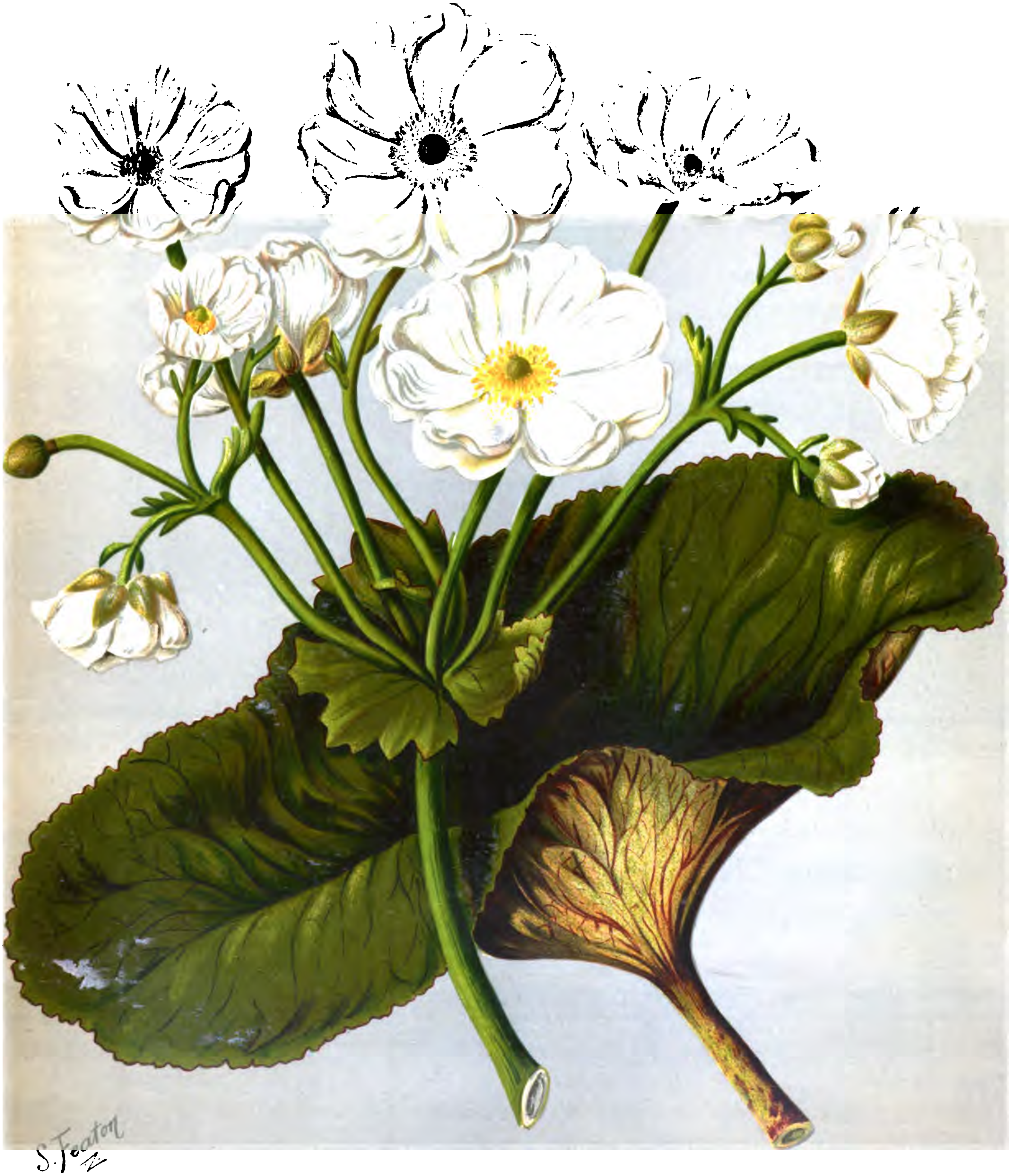
Description, etc.—A very large genus in all temperate countries, rare in tropical ones; many of its members are acrid and poisonous. Some of the New Zealand are the finest known; all are very variable, indeed. The plants belonging to this genus are generally found in moist places, and hence they are called "Ranunculus," from *rana*, a frog. They take their English name of "Crowfoot" from the shape of the leaves, which are, for the most part, deeply cut, so as to resemble the foot of a bird. The plants of this order in New Zealand not only inhabit the lowlands, but nestle in the snow rills of the Northern and Southern mountain ranges, from 5,000 to 6,000 feet above the sea level. There are about twenty species, very variable in character and form, and about the same number are reckoned to belong to the British Isles.

1. RANUNCULUS LYALLI (*Hook.*, *F.*) Mr. Lyall's Ranunculus.

SPECIFIC CHARACTER.—Leaves peltate, on long, stout petioles, glabrous; limb orbicular, very concave, thick and coriaceous, 15 in. diam.; simply crenate; veins reticulated; cauline, sessile, lobed and crenate; seedling leaves not peltate, broadly rhomboid, with cuneate bases. Peduncles very numerous, villous, stout, erect, with linear-oblong bracts. Flowers waxy-white, 4 in. diam.; Sepals, 5, broad, pilose. Petals, broadly cuneate, with an obscure oblong basilar gland. Stamens, small, short; anthers oblong. Torus, cylindric, hairy, lengthening after flowering. Achenes, villous, oblique; style flexuose, subulate; edges compressed, not margined.—*Handbook of New Zealand Flora, p. 4.*

DESCRIPTION, etc., Plate No. 3.—The "SHEPHERDS' OR MOUNTAIN LILY."—An erect, very handsome, coriaceous (leathery) plant, 2 to 4 ft. high, with a paniculately branched many-flowered stem. The flowers are white, and from 3 to 4 inches in diameter. It is indigenous to the Middle Island, in the vicinity of Milford Sound, and in moist places on the Southern Alps, at an elevation of from 2,000 to 3,000 feet, and in Otago at from 1,000 to 4,000 feet on the ranges. It is the noblest species of the Genus, and possibly the largest and handsomest Ranunculus in the world. It has been named by the shepherds of Otago the "Water Lily," on account of its fancied resemblance to that plant. This queenly plant as seen in its native home, lining the shady banks of mountain streams, and skirting the rushing cascades that dash impetuously down the steep ravines, is very striking. We learn from those who have sought out this Alpine gem in its fastnesses, that it is often found displaying as many as fifty blossoms at the same time—a truly magnificent sight. The most graphic description would fail to give any adequate idea (says Mr. F. N. Adams, of Christchurch, a very energetic botanical explorer of the snow regions of Canterbury) of the purity and charm of these Alpine flowers growing in vast numbers on the broken ground, amidst rocks and boulders deposited by the floods and glaciers, side by side with the yellow Mountain Lily (*R. Godleyanus*), and interspersed with the Alpine Marygolds *(Senecios)*, and the little star-like *Montias*. This truly beautiful Ranunculus is named in honour of Mr. Lyall, F.L.S., an ardent botanist of distinction, whose name and work is closely allied with the Flora of New Zealand, The plant is in cultivation amongst the settlers of the Middle Island, but like all Alpines. demands peculiar attention; requiring in summer the greatest sun-warmth possible, and in winter the fullest exposure to cold. This, and the *R. Traversii*, are the only known Ranunculi with peltate leaves. Owing to the large size of this plant, it was necessary to reduce its outlines from the original, a lovely specimen especially gathered for this work, from the Alpine region, midway between Christchurch and Hokitika. The plate conveys to our readers a correct representation of the plant; now no longer

> " . . . . Born to blush unseen,
> And waste its sweetness on the desert air."



COPYRIGHT

2. RANUNCULUS TRAVERSII (*Hook., F.*) Mr. Travers' Ranunculus.

Specific Character.—Very similar to *R. Lyalli*, but smaller; leaves, 6–7 in. diam., and broadly twice or thrice crenate, with deeper notches, and with two incisions near the base.—*Handbook of New Zealand Flora, p. 4.*

Description, etc.—This handsome species is second only in size and beauty to *R. Lyalli*, and is likewise a native of the Middle Island, where in the moist gullies and ravines of the mountains it luxuriates. The flowers are cream-coloured and handsome. It is named after Mr. W. T. L. Travers, F.L.S., an indefatigable botanist.

3. RANUNCULUS INSIGNIS (*Hook., F.*) The Remarkable Ranunculus.

Specific Character. — Erect, robust, paniculately branched, villous, often 4 ft. high; fulvous or rufous when dry. Leaves rounded-cordate, 4–8 in. broad, very coriaceous, crenate, and lobed; petioles, 6 in. long. Peduncles very numerous, stout, with (often opposite) linear-oblong bracts. Flowers golden, 1½ in. diam. Sepals, 5–6, oblong, woolly at the back. Petals 5–6, obcordate, with 3 glands near the base. Achenes forming a small head upon an oblong pubescent torus, villous, tumid, with a slender, nearly straight style.—*Handbook of New Zealand Flora, p. 4.*

Description, etc., Plate No. 4.—The "KORIKORI."—This fine plant is native to the Northern Island, and a portion of the Nelson District. It is the largest and handsomest Ranunculus in the northern parts, often attaining a height of four feet. It is found growing in luxuriance on the lofty summits of the Ruahine, Tongariro, and Hikurangi Mountains, and the high mountain ranges of Nelson, between Mount Arthur and Mount Peel, where it is abundant. At the time it was named *Insignis*, or "The remarkable one," it was supposed to be the finest and best Ranunculus extant, but since then others, such as *R. Lyalli*, *R. Traversii*, and *R. Godleyanus* have been discovered, and share with it the honours for size and beauty. The Maoris who ascend the mountains during early summer, when it is in bloom, never fail to secure a specimen of this plant to adorn their hats, in order to shew their prowess, and as a remembrance of their adventurous journey. It is known to the settlers as the Big Buttercup, and is probably the largest buttercup in the world. The subject of our plate was obtained in the Nelson district, and shews vividly the character of this grand Ranunculus. As soon as the snow disappears the "Korikori" rears up its head, and gladdens the mountain sides with its golden cup-like flowers. Many of the European *Ranunculaceæ* are favourite garden flowers, and vary much in colour and form. The Buttercup, Monkshood, Larkspur, Columbine, Bachelor's Buttons, and Hellebore are all members of this family. The common Buttercup (*R. acris*), were it not a common weed, would be thought a beautiful flower from the golden hue of its glossy petals, and its very handsome leaves. Shakespeare, in his writings, makes many allusions to the Buttercup, under the name of

Cuckoo Cup, Cuckoo Bud; and many of the old writers speak of it as Golden Cup and King Cup. Gerarde, the Elizabethan herbalist, informs us with great delight, "that in a field at Southwark, at the back of the theatre by London—the Globe, Shakespeare's Theatre—he found amongst the glazed and golden cups of Crowfoot growing there, one with a double flower." The Buttercup is so called from the vulgar notion that, when eaten by cows, it gives a deeper yellow to the butter; the fact is that the cow will not touch it, and that its long stalks may be seen standing in great abundance in pastures, all the grass of which has been eaten off quite close by cattle. Buttercups possess a poisonous property, which disappears when the flowers are dried in hay. So caustic are the petals that they will sometimes inflame the skin of tender fingers. Every child should be cautioned against eating them; indeed it is desirable to caution children about tasting the petals of any flowers or putting into their mouths any leaves except those known to be harmless. The subject of our Plate No. 4, *R. insignis,* is well worthy of cultivation. It may be grown from seed, or by transplanting. Specimens have been sent to the Royal Gardens, Kew, England, where it may be seen growing, and it has been successfully produced in colonial gardens. It likes a stiff soil, and blooms in the spring of the year. It is asserted by some that it blossoms again in the autumn.

OTHER SPECIES OF RANUNCULUS.

4. R. PINGUIS (*Hook., F.*)

Leaves entire, 1–3 in. Petals, 5–8. Achenes, glabrous. Flowers, ¾–1 in. diam.; golden. Found on the high lands of the Middle Island. It is called *Pinguis* on account of its stout and fleshy habit.

5. R. NIVICOLA (*Hook.*)

Leaves deeply notched, 3–7 lobed. Petals, 10–15. Flowers, many, bright yellow, 1½ in. diam. Northern Island, near the perpetual snow on Mount Egmont. Named *Nivicola*, owing to its growing in close proximity to the perpetual snow.

6. R. GERANIIFOLIUS (*Hook.*)

Leaves 3–5 lobed. Petals, 10–12. Flowers few, ½–1½ in. diam., golden. Closely allied to *R. nivicola*, but smaller in all its parts. Northern Island, snow rills on the Ruahine range; Middle Island, Southern Alps, alt. 2,500 feet. It derives its specific name from the geranium-like appearance of its leaves.

7. R. BUCHANANI (*Hook., F.*)

Glabrous; leaves lobed, or partite. Scape, 1-flowered, white. Middle Island, Otago Lake District in large patches; alt. 5,000 to 6,000 feet. Named in honour of Mr. J. Buchanan, F.L.S., botanical draftsman and botanist, lately in the service of the New Zealand Geological Department.

8. R. HAASTII (*Hook., F.*)

Glabrous, fleshy; leaves multifid, cauline involucrate. Flowers many, yellow. Middle Island, shingle beds on Mount Torlesse, and the Ribbonwood range; alt. 4,000 to 6,000 feet. Named after Sir Julius Von Haast, F.R.S., Curator of the Canterbury Museum.

R. GODLEYANUS (*Hook., F.*)

Erect, very stout; 1 ft. high. Leaves all radical, with broad, thick petioles, 2–5 in. long, and 1 in. broad; blade, 6–7 in. long. Scapes, stout. Flowers numerous, cormybose, 1–1½ in. across; deep yellow. Middle Island; Whitcombe Pass, on the edge of a lagoon; alt. 4,200 feet. Named in honour of Mr. Godley, the pioneer settler of Canterbury.—*Additional Notes, Handbook of New Zealand Flora, p. 723.*

There are many other species, all of which are stated to be smaller, and less remarkable, than those mentioned. A drawing of the ***R. plebeius*** is given in our Plate No. 5, fig. 1. This species is abundant throughout the Islands. It is likewise a common Australian plant, and probably also indigenous to South Africa and Europe.

GENUS IV.

CALTHA (*Linn.*) The Caltha, or Marsh Marigold.

Generic Character.—Glabrous tufted herbs, with most, or all of the leaves, radical, and 1-flowered scapes. Sepals, 5 or more, petaloid, imbricate. Petals, none. Stamens, numerous. Carpels several, with many ovules in two rows on the ventral suture. Follicles splitting along the inner face, several-seeded.—*Handbook of New Zealand Flora, p. 9.*

Description, etc.—A small genus, found in the temperate and cold regions of both hemispheres, distinguished from ***Ranunculus*** by the absence of a green calyx, and from ***Helleborus*** by the absence of tubular petals. The flower of the *Caltha* is yellow, its name denoting a flower yellow in colour and strong of smell.

1. CALTHA NOVÆ ZELANDIÆ (*Hook., F.*) The New Zealand Caltha.

Specific Character.—Short, stout, tufted, glabrous perennial, with a thick rootstock, numerous radical leaves, and short, thick, 1-flowered scape. Leaves spreading; blade ovate-oblong, notched at the apex, deeply cordate, and auricled at the base, with the obtuse auricles turned up and appressed to the surface of the leaf. Petioles, 1–6 in., dilated at the base into large membranous sheaths. Flowers, 1–2 in. diam. Sepals, 5–7, linear subulate. Stamens short, very numerous. Carpels 5–7, broadly ovate, gibbous; style short, hooked.—*Handbook of New Zealand Flora, p. 9.*

Description, etc.—Fig. 2, Plate No. 5.—The "NATIVE CALTHA."—Northern Island, top of the Ruahine mountains. Middle Island, alpine districts, at an altitude of from 4,000 to 6,000 feet. The *C. introloba* of Tasmania and Victoria is very closely allied to this species. The true Marsh Marigold, *C. palustris,* is a stout herbaceous plant, with hollow stems, large, glossy, roundish-notched leaves, heart-shaped at the base, and conspicuous bright yellow flowers. It is a native of Europe, Western Asia, and North America, growing in marshy meadows and about the margins of ponds, rivers, and brooks. The flowers, if gathered before they expand, are said to be a good substitute for capers. The juice of the petals, boiled with alum, stains paper yellow. The *Caltha* of the Latin poets is considered to be the common Garden Marigold.

CHAPTER II.

ORDER II.—MAGNOLIACEÆ (*Tribe Wintereæ.*) The Magnolia Family.

CHARACTER OF THE ORDER.—Aromatic shrubs or trees, with alternate, exstipulate leaves. Sepals and petals imbricated in 2, 3, or in many series; very deciduous. Stamens numerous; hypogynous. Filaments often thick or dilated; anthers, adnate. Carpels few, in 1 series, with 2 or more ovules attached to the ventral suture. Stigma sessile and terminal, or decurrent along the suture. Ripe carpels of free, small drupes, follicles or berries. Seeds few; testa shining; albumen copious, fleshy; embryo small.—*Handbook of New Zealand Flora, p. 9.*

DESCRIPTION OF THE ORDER.—

CONTAINING many genera, this order abounds in the Southern United States, the mountainous regions of India, and Eastern Asia; its qualities are aromatic. The Magnolia, from which the order receives its name, is a well-known plant, and was so called to commemorate the fame of that celebrated botanist, Pierre Magnol, Professor of Medicine and Botany at Montpellier, in the latter part of the seventeenth, and beginning of the eighteenth, century. The genus **MAGNOLIA** consists for the most part of large trees, with fine foliage, and handsome fragrant flowers. Most of the species have aromatic tonic properties, which has led to their employment in fevers, rheumatism, and other complaints. The beauty of the foliage and flowers of these trees give them yet greater claims to our regard than their medicinal properties, which, although not slight, are excelled by those of other plants. The noblest of all is, perhaps, *M. grandiflora*, a native of North Carolina, where it forms a tree sixty to one hundred feet high, though one mentioned as indigenous to Northern India, growing to the height of one hundred and fifty feet. Some of the species in cultivation are low-growing shrubs, differing in the shape of their leaves and period of flowering, but all possess an exquisite fragrance.

There are a few species and varieties that need the protection of a greenhouse, even in temperate climates. In New Zealand, the order is represented by only one genus, Drimys, generally considered by botanists to consist of two species, *D. axillaris* and *D. colorata,* but neither of them possess fragrance.

GENUS I.

DRIMYS (*Forst.*) The Drimys.

Generic Character.—Sepals, 2 or 3, membranous, combined into an irregularly lobed calyx. Petals, 6 or more in 2 or more series. Filaments thickened upwards; anther cells diverging, carpels few.—*Handbook of New Zealand Flora, p. 10.*

Description, etc.—A genus consisting of trees, natives of South America, Australia, Borneo, New Caledonia, and New Zealand. *D. Winteri,* a native of Chili and the Straits of Magellan, furnishes the bark known as Winter's Bark, which, both in appearance and properties, is much like *Canella* bark, but of a darker colour internally. It is a stimulant aromatic tonic, but is seldom used. This bark was first introduced into England by Captain Winter in 1579, he having accompanied Sir Francis Drake to Magellan Straits. In Brazil the bark of the *D. granatensis* is used against colic. *D. piperita* is a native of Borneo.

1. DRIMYS AXILLARIS (*Forst.*) The Axil-flowered Drimys.

Specific Character.—A small, slender, evergreen tree, 10–30 ft. high, with black bark, aromatic and pungent in all its parts. Leaves 1–6 in. long, elliptical-ovate, blunt, shortly petioled, quite entire, bright green above, glaucous below, pellucid dotted, midrib hairy beneath. Flowers small, axillary, or from scars of fallen leaves, solitary, or few together; pedicels slender. Petals unequal, linear. Stamens 8–10, in several series. Berries about 3, size of a peppercorn. Seeds, several angled.—*Handbook of New Zealand Flora, p. 10.*

Description, etc.—Fig. 3, Plate No. 5.—The "HOROPITO."—This beautiful little evergreen tree is fairly abundant in forests throughout the Islands. It will be seen that though it is classed as one of the Magnolia family, it has but little general resemblance to the handsome plants of that name, which grace our gardens, and regale us with their fragrance. Apart from this, however, it has some pretensions of its own; with its bright shining foliage, and coal-black branches dotted here and there with clusters of orange-coloured berries, almost always growing together in groups of threes. It is very generally known by the colonists as the "Pepper Tree," on account of its highly pungent properties. The flowers are insignificant, and of a pale green colour, closely set in upon

PLATE No. 5.

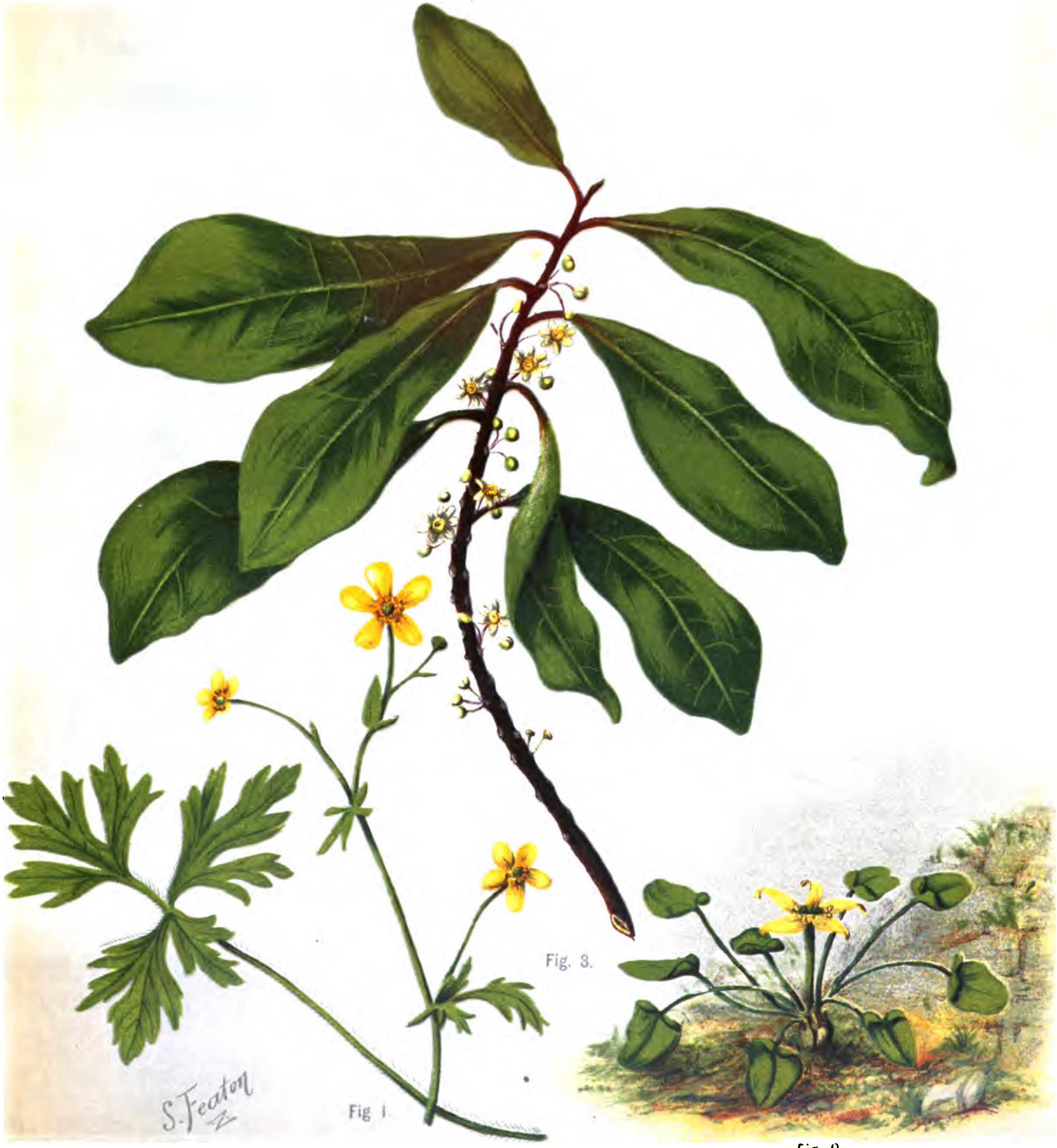


Fig. 3.
S. Featon
Fig 1
Fig. 2.

COPYRIGHT.

BOCK & COUSINS, CHROMO-LITHO

the branches. The medicinal properties which pervade the whole plant are sedative and tonic. A decoction of the leaves is not uncommonly used by bushmen and others to allay inward pain, and is honoured with the name of "Maori Painkiller." In the South the tree is botanically known as *D. colorata*, and is said to have pale blotched leaves, being generally considered a different species; this latter is also found in mountain districts of the Northern Island. The trunk is rarely more than six or eight inches in diameter. The wood, which is pale in colour, is useful for inlaying and small cabinet work, and for such is generally in request.

CHAPTER III.

ORDER III.—CRUCIFERÆ. The Cruciform Family.

CHARACTER OF THE ORDER.—Herbs, usually with small racemose flowers. Sepals 4, free. Petals 4, free, placed crosswise. Stamens 6, (rarely 1, 2 or 4), hypogynous, 2 longer than the others. Ovary 2-celled, with 2 or more ovules. Capsule 2-(rarely 1) celled, bursting longitudinally by 2 valves, which fall away from the seed-bearing placentas. Seed, exalbuminous with the radicle turned up towards the edges (accumbent) or back of the cotyledons (incumbent).—*Handbook of New Zealand Flora, p. 10.*

DESCRIPTION OF THE ORDER.—

A LARGE order abounding in all temperate climates, especially in Europe and Asia—most of the New Zealand genera are also British—the properties of the plants are stimulant, and antiscorbutic. None of the plants are poisonous, and many of them are culinary vegetables, such as Cabbage, Cauliflower, Turnip, Radish, Cress, Horse-radish, etc. They contain much sulphur and nitrogen, and, on account of this, when decaying, give off a disagreable odour. Many garden flowers, such as Wall-flower, Stock, Rocket, and Honesty, are found in this order, which takes its name from the four petals arranged like a cross, which regularity of form, marks it as very distinguishable. The New Zealand genera consists of the following:—1, **NASTURTIUM**, flowers yellow; 2, **BARBAREA**, flowers yellow; 3, **SISYMBRIUM**, white or yellow flowers; 4, **CARDAMINE**, white flowers; 5, **BRAYA**, white flowers; 6, **LEPIDIUM**, white flowers; 7, **NOTOTHLASPI**, white flowers.

GENUS I.

NASTURTIUM (*Brown.*) The Water Cress.

GENERIC CHARACTER.—Branching herbs with usually yellow flowers, and cut leaves. Sepals, spreading. Petals, with short claws, yellow, sometimes none. Stamens, 6 or fewer. Pod, sub-cylindric, usually curved, valves membranous, concave, many-seeded. Seeds in 2 series in each valve, minute, turgid. Cotyledons accumbent.—*Handbook of New Zealand Flora, p.* 10.

DESCRIPTION, etc.—A large British genus of which the Water Cress (*N. officinale*) is a white-flowered species, abundantly naturalized in New Zealand rivers, etc. The genus is said to have derived its name from the effect its acridity produces on the muscles of the nose—*nasus tortus*, signifying a convulsed nose.

1. NASTURTIUM PALUSTRE *(D.C.)* The Marsh Cress.

SPECIFIC CHARACTER.—A sub-erect glabrous, or pilose, branching herb, with entire or pinnatifid leaves, auricled at the base, the lobes sinuate-toothed. Flowers on slender pedicels, small. Petals hardly longer than the calyx. Pods turgid, oblong, as long as or shorter than their pedicels, curved.—*Handbook of New Zealand Flora, p.* 11.

DESCRIPTION, etc.—This herb is not uncommon in moist places, in both the Northern and Middle Islands. Sir J. D. Hooker says in his notes that he adopted the name *palustre* for this plant because it is that used in most Continental books, and in "Bentham's Australian Flora," but that of *terrestre* has equal claims to be retained. It is a very widely-distributed plant in both the Old and New World. A state with almost entire leaves, *N. semipinnatifidum,* (Hook.,) sometimes occurs. The common Watercress (*N. officinale*), which is indigenous to Britain is a well-known, hardy perennial, and has been abundantly naturalised in New Zealand. In the rivers of Canterbury and in many other favourable localities it has become a perfect pest, attaining a size rarely seen in Europe. As a spring salad the young shoots and leaves of Watercress have been used from time immemorial. They are stated to have been eaten by the ancients along with lettuces, to counteract the coldness of the latter by their warm and stimulating properties, and at the present day they are found upon almost every table, the popular belief being, that when eaten fasting, they possess the property of exciting the appetite, and acting as a powerful anti-scorbutic. The first attempt in Europe to cultivate Watercresses by artificial means was made by one Nicholas Meissner at Erfurt, the capital of Upper Thuringia, about the middle of the sixteenth century. The soil and other circumstances being favourable for their growth, the experiment proved successful, and the Watercresses of Erfurt soon acquired, for their superior quality, that celebrity which they still maintain; most of the cities on the Rhine, as well as the markets of Berlin, 120 miles distant, being constantly supplied with them. In the neighbourhood of London the cultivation of Watercresses was first introduced by a Mr. Bradbury at Springhead near Gravesend, and has continued to spread, particularly in localities favourably situated with regard to springs of water. Near Rickmansworth in Hertfordshire, Waltham Abbey in Essex, Uxbridge in Middlesex, and various other places, there are plantations many acres in extent, which are scarcely sufficient to supply the great demand for this popular salad herb during the season. It may not be inappropriate here to mention that the plant commonly known in our gardens as the Nasturtium, does not belong to the Crucifers, but properly bears the name of *Tropæolum majus.* It has obtained the name of Nasturtium on account of its warm taste, a quality not unlike that of the common cress. The New Zealand Marsh Cress is edible, and was formerly eaten by the natives.

GENUS II.

BARBAREA (*Brown.*) The Herb of St. Barbara, or Winter Cress.

Generic Character.—Stout or slender, erect, leafy, glabrous herbs, usually with angled stems, and pinnate or pinnatifid leaves. Sepals sub-erect. Petals clawed, yellow. Pods erect, elongate, compressed, 4-gonous, with keeled or costate, straight, coriaceous, many-seeded valves. Seeds oblong, in one series; cotyledons accumbent.—*Handbook of New Zealand Flora, p. 11.*

Description, etc.—A common European genus, of which one species was cultivated in former times in Britain, as a pot-herb. The New Zealand species, and also the Australian, are stated to be the same as the British, which is very variable. *B. vulgaris,* a double-flowered garden variety, commonly called the "Double Yellow Rocket," is very ornamental. The name, *Barbarea,* alludes to the plant being vulgarly called the "Herb of St. Barbara."

1. BARBAREA VULGARIS (*Linn.*) The Common Herb of St. Barbara.

Specific Character.—Erect, rather rigid, stout, leafy, 1–2 ft. high, with green furrowed stems. Lower leaves lyrate, pinnatifid; lobes obovate-oblong, terminal, ovate and sinuate. Upper leaves entire, sinuate, or pinnatifid. Flowers rather large. Pods stout, $1\frac{1}{2}$ in. long, $\frac{1}{10}$–$\frac{1}{8}$ in. broad, erecto-patent, broader than their terete pedicels; valves veined; style short, straight.—*Handbook of New Zealand Flora, p. 11.*

Description, etc.—This herb is indigenous to the Northern Island, and was formerly used by the Natives as food. Upon the authority of Mr. Colenso, the native name of this plant is "Toii." In Britain, *B. vulgaris* was held as a herb of some repute, when the field or brook furnished the only salads, but was banished from the table by vegetables of better flavour.

GENUS III.

SISYMBRIUM (*Linn.*) The Mountain Cress.

Generic Charecter.—Herbs, usually leafy, with slender stems and small white or yellow flowers. Sepals sub-crect or spreading. Petals clawed. Pods slender, terete or slightly compressed; valves concave, many-seeded. Seeds in one series in each cell, oblong.—*Handbook of New Zealand Flora, p. 11.*

Description, etc.—A British genus, abundant in the North Temperate Zone; rare in the South. The plants are uninteresting, and not easily to be distinguished from several allied genera. The name, *Sisymbrium,* is from the Latin, and alludes to "A kind of herb," perhaps, watercress.

1. SISYMBRIUM NOVÆ ZELANDIÆ (*Hook., F.*) The New Zealand Sisymbrium.

Specific Character.—Tall, very slender, 1-2 ft. high, glabrous, or covered with minute stellate pubescence. Leaves chiefly radical, spreading, 1-2 in. long, few or many, and crowded, narrow obovate, or linear oblong, sinuate-pinnatifid; lobes blunt. Flower stems very slender, sparingly-branched, with few, entire or toothed linear leaves. Flowers small, white. Petals narrow. Sepals erect. Pods $\frac{1}{2}$–2 in. long, $\frac{1}{15}$ in. broad, very narrow, linear, obtuse, glabrous, on slender pedicels; valves convex, 1-nerved. Seeds small. Cotyledons obliquely incumbent.—*Handbook of New Zealand Flora, p. 11.*

Description, etc.—This herb is found in the Middle Island on the Nelson mountains, and in the shingle slips of the Wairau Gorge, at an altitude of 4,500 feet. There are numerous species in Britain, of which the most common are the *S. alliaria,* or Garlic Mustard, sometimes called "Sauce alone," a tallish hedge-weed with heart-shaped leaves, white flowers and erect pods. *S. officinale,* an erect, branched plant, with rough stems and leaves, minute pale yellow flowers, and rough pods, a common hedge-weed; and *S. thalianum,* a field-weed growing from three to eight inches high, with oblong toothed leaves, and slender stems, bearing a few inconspicuous white flowers.

GENUS IV.

CARDAMINE (*Linn.*) The Bitter Cress.

Generic Charactre.—Generally slender or small herbs,. with entire or pinnate leaves, and small white flowers. Sepals erect or spreading. Petals clawed or spathulate. Pod long, linear, compressed; valves flat, usually separating elastically, and curving backwards. Seeds numerous, forming one series in each cell, flattened. Cotyledons accumbent.—*Handbook of New Zealand Flora, p. 12.*

Description, etc.—An extensive genus common in England, and in all temperate regions, distinguished by the nerveless valves of the flat narrow pod, which, when the seeds are ripe, curl with an elastic spring from the base upwards, thus scattering the seed. The prettiest of the numerous species of this genus are British plants, which are rarely cultivated in gardens, from their great abundance in the open country. All the Cardamines are anti-scorbutic, and they are said to be very efficacious in diseases of the heart. The derivation of the name Cardamine is from the Greek words *kardia* the heart, and *damæo* to subdue. The New Zealand species are: (1). C. HIRSUTA, leaves pinnate; (2). C. DEPRESSA, leaves spathulate; (3). C. STYLOSA, leaves sinuate lobed; (4). C. FASTIGIATA, leaves long, deeply toothed.

1. CARDAMINE HIRSUTA (*Linn.*) The Hairy Cardamine.

Specific Character.—A very variable, slender branched, rarely simple, glabrous, or slightly hairy annual, 12–18 in. high, erect or decumbent, sometimes assuming a perennial rootstock, especially near the sea. Leaves pinnate; Leaflets few, opposite, or alternate, entire or lobed, orbicular oblong-ovate, or cordate, usually on slender petioles, sometimes reduced to one. Flowering branches sometimes reduced to capillary 1-flowered scapes. Flowers small, white (sometimes 4-androus in Europe). Pods ¾–1½ in. long, slender, on slender pedicels, obtuse or produced into acuminate styles. Seeds small, pale yellow-red.—*Handbook of New Zealand Flora, p. 12.*

Description, etc.—Fig. 1, Plate No. 6.—The "HAIRY CARDAMINE."—This herb is abundant throughout the Islands, especially in moist and shady situations. There are four recognized varieties in New Zealand, differing somewhat in habit and structure. The succulent members of the family form an excellent salad. In Britain and elsewhere in the Northern Hemisphere this plant is an annual, but, in the more equable climate of the Southern Hemisphere, it is usually a perennial. *C. hirsuta*, is a common weed everywhere in England, varying in height from six to eighteen inches, according to soil and situation. The leaves and flowers of this species form an agreeable salad. This species, and, it is said, others, produce young plants from the leaves. The Cuckoo Flower, or Lady's Smock, (*C. pratensis,*) is a common and very pretty meadow plant, with large pale lilac flowers. Its first English name is due to its blossoming when the Cuckoo sings, and its second, to the fact that its flowers are produced in such abundance as to give the meadows the appearance of a bleaching ground, covered with clothes laid on the grass to dry. These flowers are associated with pleasant memories of spring, and join with the Cowslip, Primrose and Harebell to compose many a rustic nosegay. A double variety is sometimes found wild, which is remarkably proliferous, the leaflets where they come in contact with the ground producing new plants; and the flowers, as they wither, sending up a stalked flower-bud from their centre. The plants are warmly stomachic, and have the flavour of watercress.

OTHER SPECIES OF CARDAMINE.

2. C. DEPRESSA.

A glabrous, or pilose, stemless perennial. Leaves crowded, rosulate. Flowers small, white. This species has two varieties. Found at high altitudes in the Middle Island.

3. C. STYLOSA.

A perennial 2 – 3 feet high. Leaves 3 – 5 inches long. Flowers rather small, white. Found at the Bay of Islands, and about Auckland.

4. C. FASTIGIATA.

A glabrous perennial, with a rootstock a span long, tapering, as thick as the little finger, densely clothed with the recurved bases of the old leaves, a very singular looking plant. Flowers very numerous, white. Found in the Middle Island at high altitudes.

GENUS V.

BRAYA (*Sternberg.*) The Braya, or Pachycladon.

Generic Character.—Alpine, densely tufted, perennial herbs, with long tap roots, rosulate radical leaves, and scapes bearing short few-flowered racemes, or corymbs. Flowers white, pink, or purplish. Sepals short, equal. Petals obovate, Stamens 6. Pod short, thick, ovate or oblong; valves convex, with a short costa, or keeled; Septum entire, or open; style very short; Stigma capitate. Seeds in 1 or 2 series; funicles very short; cotyledons incumbent.—*Handlook of New Zealand Flora, p. 13.*

Description, etc.—An Arctic genus, also found, but rarely, in the loftiest Alps of Europe, Northern Asia, and North and South America.

1. BRAYA NOVÆ ZELANDIÆ (*Hook., F.*) The New Zealand Braya.

Specific Character.—A very short depressed Alpine herb, covered with stellate pubescence, root long, tap-shaped, as thick as the finger, bearing one or several equally thick, erect or ascending cylindric branches, covered with scars of old leaves, and surmounted by a head of small imbricating leaves that spread out horizontally. Leaves ⅛–¼ in. long, oblong, pinnatifidly lobed, narrowed into flat short petioles; those on the scapes with longer petioles, and a minute obovate blade, which is digitately lobed at the top. Scapes or peduncles very numerous, rising from the root below the leaves, shorter than these, and spreading horizontally, 3–5 flowered. Flowers not seen. Pod ⅛–⅓ in. long, about half as broad, laterally compressed; septum incomplete. Seeds 3–5 in each valve, obovoid.—*Handbook of New Zealand Flora, p. 13.*

Description, etc.—Fig. 2, Plate No. 6.—The "NEW ZEALAND BRAYA."—This remarkable little Alpine plant is found in the *débris* of schist, on Mount Alta, in the Wanaka Lake district, in exposed ridges not under an altitude of 5000 feet, or in the crevices of rocks, where it is often surrounded by snow. The progress of flowering and seeding is very rapid in this plant, as the heat during the day in sunshine at these high altitudes is intense, producing a rapid growth Our plate depicts the plant with flower and seed. The flowers are white, and are described by Mr. John Buchanan, F.L.S., as ⅐ of an inch long. Sepals obovate, obtuse, petals longer than the sepals, upper half round, tapering below to a narrow point.—"*Alpine Flora,*" *Vol. XIV.*, "*Transactions New Zealand Institute.*" It may be noted that for want of information a description of the flowers of this plant is not given in the "*Handbook.*"

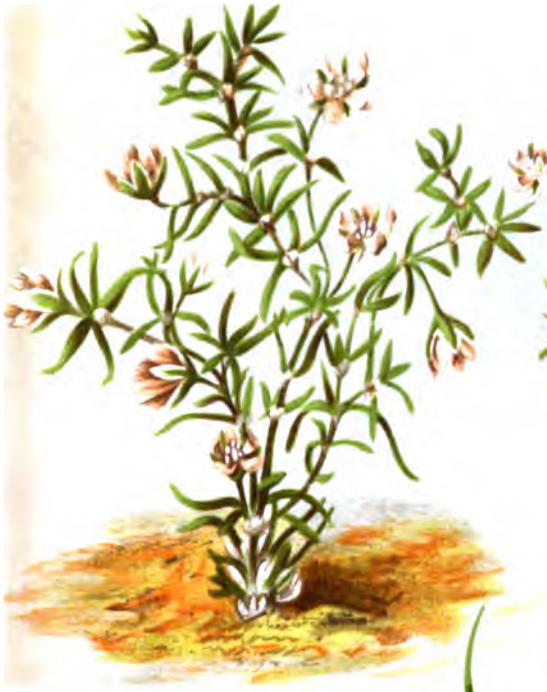


FIG. 8

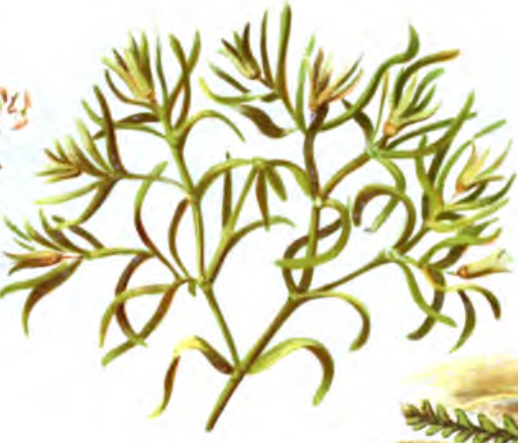


FIG. 5

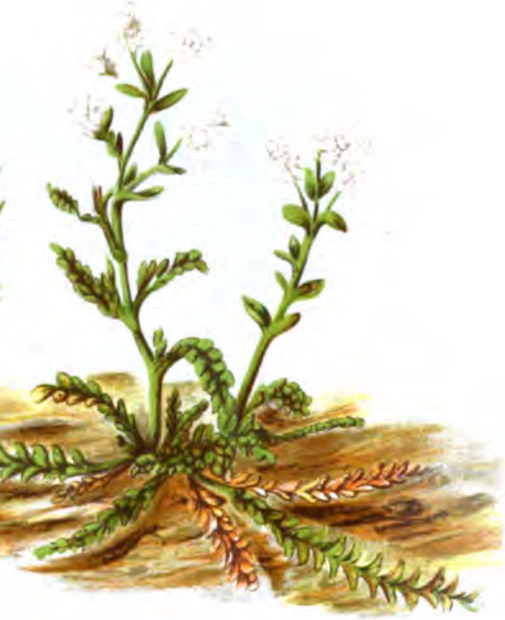


FIG. 3

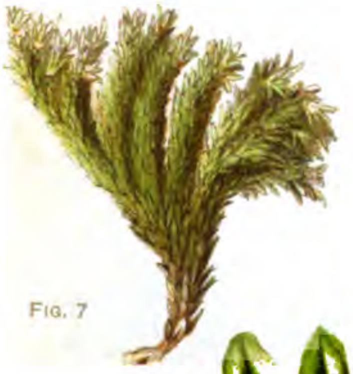


FIG. 7

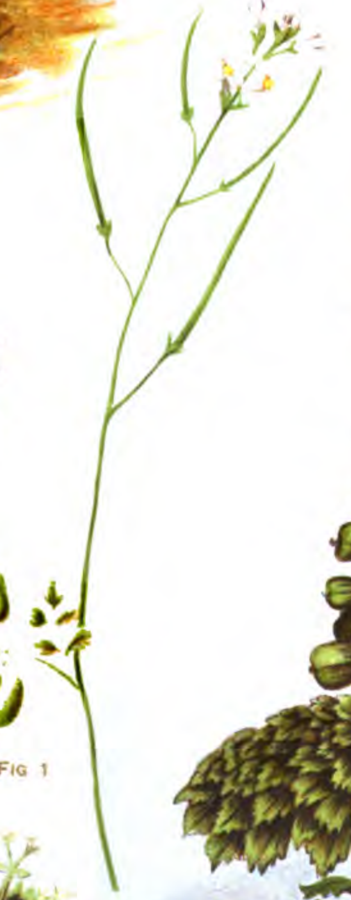


FIG. 1

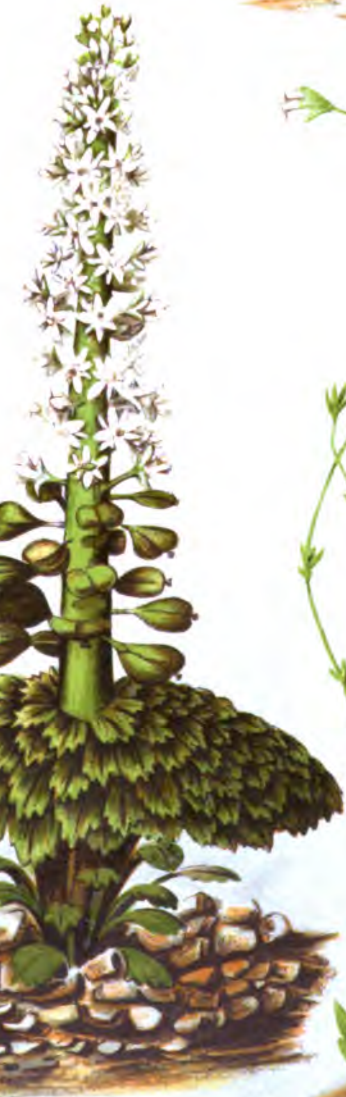


FIG. 4

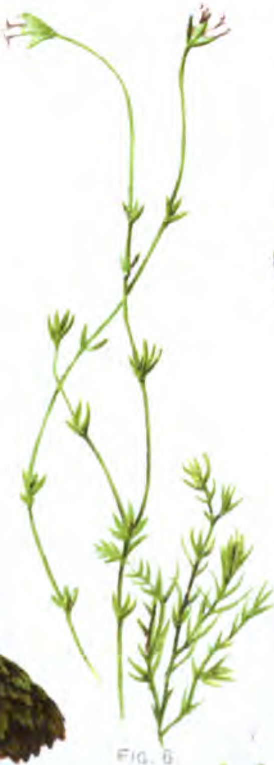


FIG. 6

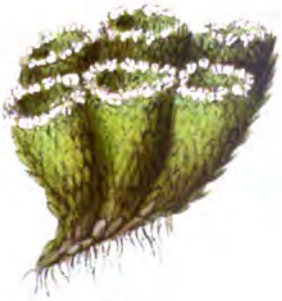


FIG. 10

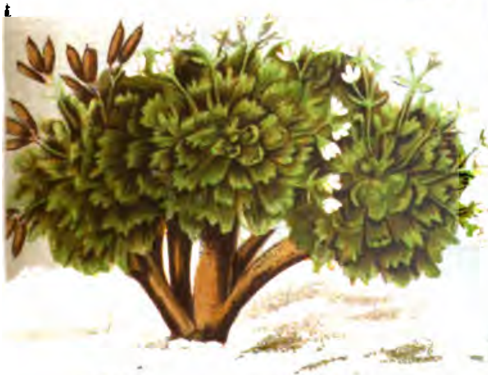


FIG. 2

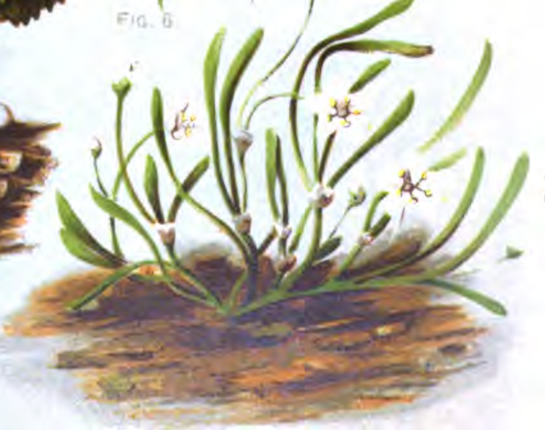


FIG. 9

PYRIGHT.

BOCK & COUSINS, CHROMO-LITHO

Fig. 1.—CARDAMINE HIRSUTA. Fig. 2.—BRAYA NOVÆ ZELANDIÆ. Fig. 3.—LEPIDIUM INCISUM. Fig. 4.—NOTOTHLASPI ROSULATUM Fig. 5.—STELLARIA ROUGHII. Fig. 6.—STELLARIA GRACILENTA. Fig. 7.—COLOBANTHUS ACICULARIS. Fig. 8.—SPERGULARIA RUBRA Fig. 9.—CLAYTONIA AUSTRALASICA. Fig. 10.—HECTORELLA CŒSPITOSA.

GENUS VI.

LEPIDIUM (*Linn.*) The Lepidium.

Generic Character.—Herbs sometimes with an almost woody stem, toothed, or pinnatifid leaves, and white, sometimes unisexual flowers. Stamens, 4 or 6. Pods, broad, much flattened laterally, obtuse, winged or keeled at the back; Cells 1-seeded. Cotyledons incumbent.—*Handbook of New Zealand Flora, p. 14.*

Description, etc.—An extensive genus spread throughout the temperate regions of the earth, and common in England. To this genus the Garden Cress belongs, *L. sativum;* also the *L. ruderale,* a common Australian and European annual, with linear leaves. The New Zealand species consist of:—(1). L. oleraceum, leaves more or less toothed; (2). L. sisymbrioides, leaves pinnatifid; (3). L. incisum, leaves pinnatifid.

1. LEPIDIUM OLERACEUM (*Forst.*) The Esculent Lepidium.

Specific Character.—Sub-erect, perennial, glabrous, 10–18 in. high; Stem, stout, woody, scarred, branched, smelling disagreeably when bruised. Leaves, obovate-cuneate or oblong-spathulate, 1–3 in. long, lower serrate, upper more entire. Flowers, numerous, white, small, 4-androus. Pods on slender spreading pedicels, ovate, sub-acute, ⅛ in. long, not winged on back.—*Handbook of New Zealand Flora, p. 14.*

Description, etc.—This plant is confined to New Zealand, and is to be found growing in sheltered places on the sea shores throughout the Islands. It is a good anti-scorbutic, and was eagerly sought after by early voyagers as a remedy for the dreaded Scurvy, with which the crews were so frequently affected. The Maoris call it "Nau;" and it is stated that they formerly cultivated it as a pot herb. When broken or bruised, the plant emits a strong and unpleasant odour. The natives of the Society and Sandwich Islands make use of *L. piscidium* for catching fish, it, in common with several other plants, possessing the property of intoxicating them, so that they float upon the surface in a helpless, insensible state, and are then easily taken. *L. sativum,* the common Garden Cress, is a hardy annual, whose native country is stated to be Persia. This has been in cultivation in England since 1548. It is very generally cultivated and esteemed as a plant most useful for making small salads.

OTHER SPECIES OF LEPIDIUM.

2. L. SISYMBRIOIDES.

An erect, slender plant, a span high. Leaves small, linear, pinnatifid. Flowers small, white. Found in the Middle Island on dry, grassy flats and plains.

3. L. INCISUM.

Description, etc., Fig. 3, Plate No. 6.—The "CUT-LEAVED LEPIDIUM."—A prostrate plant, lower leaves on long petioles, pinnatifid. Flowers in small axillary or terminal, few-flowered, racemes. Found in the Northern Island, on the beach at Port Nicholson. Very rare. Professor Kirk says that he has never seen a specimen of this plant, which appears to be extremely local. Mr. Colenso, he further says, is the only living botanist who has met with it, and the place at which he found it has not proved productive of late years. We are indebted to Mr. Buchanan for the specimen given in our plate.

GENUS VII.

NOTOTHLASPI (*Hook., F.*) The Notothlaspi.

Generic Character.—Herbs with numerous spathulate, thick, radical leaves. Flowers, rather large, white. Sepals, crect. Pods, very much flattened; Valves winged; Cells, very many, seeded. Seeds on very slender funicles; radicle, incumbent, sometimes very long.—*Handbook of New Zealand Flora, p. 14.*

Description, etc.—A genus confined to New Zealand, consisting of the following species:—(1). N. rosulatum; (2). N. australe (*Hook., F.*); (3). N. notabilis (*Buch.*)

1. NOTOTHLASPI ROSULATUM (*Hook., F.*) The Rosette Notothlaspi.

Specific Character.—A very stout, erect, densely leafy pyramidal fleshy herb. Stem, 0. Leaves, numerous, densely crowded, forming a rosette; spathulate-petioled, crenate; when young, covered with weak, cellular hairs, glabrous when old. Scape often thicker than the finger; a span high, bearing a profusion of sweet-scented flowers. Pods, ½–1 in. long, obovate, etc.—*Handbook of New Zealand Flora, p. 15.*

Description, etc., Fig. 4, Plate No. 6.—The "ROSETTE NOTOTHLASPI."—This remarkable little alpine is confined to the Middle Island, and is found on the shingle beds of the Ribbon Range, Mount Torlesse, Waimakariri Valley, and in other places on the Alpine ranges, from 3,500 to 6,500 feet altitude. The leaves are arranged in the form of a rosette, and are from 1–1½ in. long. The flower scape, rising 5 inches or so out of the centre of the plant, is covered with a profusion of creamy-white flowers, which exhale a rich perfume as of orange blossoms. The general appearance of the plant is pyramidal, and altogether presents to the eye and fancy of the botanist a form unique, and not to be passed unheeded. It is exceedingly prized by collectors, who subject themselves to much danger and many hair-breadth escapes to secure this much-coveted treasure. The plant being very rare, necessitates both long and hazardous journeys, until the securing of a few specimens stimulates the weary climbers to renewed activity amidst the snows, rain and fogs of the Southern Alps.

2. N. AUSTRALE.

Likewise an Alpine plant; is a small perennial, densely-tufted, much-branched, and glabrous, with short leafy branches, and very numerous white corymbose flowers. Branches, 1–2 in. long. Leaves petiolate, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, spathulate, oblong, often re-curved. The flowers of this species are scentless. It is found only in the Middle Island, Nelson District, at an altitude of from 4,000 to 5,000 feet.

3. N. NOTABILIS. New species.

This remarkable little alpine agrees in several details with the description of *N. rosulatum*, given above; that species, however, being described as a pyramidal, fleshy herb, with a scape sometimes thicker than the little finger, and a span high; whereas, *N. notabilis*, is a small, circular, densely-leaved plant, with the infloresence forming a terminal sphere of small white flowers. It has no stem, the leaves being arranged like a miniature umbrella, surmounted by a small, dense ball of white flowers. This addition to our New Zealand Flora is due to Mr. J. Buchanan, F.L.S., one of our most enthusiastic field and indoor botanists, who first discovered it, in the year 1881, at the head of Lake Ohau, at an elevation of 3,000 feet.

Chapter IV.

Order IV.—VIOLARIEÆ. (The Violet Family.)

Character of the Order.—Herbs or shrubs, with alternate stipulate leaves. Flowers, regular or irregular. Sepals, 5, imbricate. Petals, 5, imbricate. Stamens, 5, hypogynous; anthers sessile, or on short filaments, often united, the connective usually expanded upwards, or provided with an appendage at the back or both. Ovary with 2-5 parietal placentas, and one style. Fruit, a capsule or berry. Embryo axile in fleshy albumen.—*Handbook of New Zealand Flora, p. 16.*

Description of the Order.—

WIDELY distributed through tropical and temperate regions, this order contains between two and three hundred known species, dispersed over nearly all parts of the globe, and distributed into twenty-one genera, forming four tribes. The New Zealand genera consist of:—(1). **Viola**, herbs with trailing stems or short woody stocks; (2.) **Melicytus**, shrubs with short petioled toothed leaves; and (3.) **Hymenanthera**, woody shrubs with alternate leaves and small axillary flowers.

GENUS I.

VIOLA (*Linn.*) The Violet.

Generic Character.—Herbs with trailing stems or short, woody stocks. Leaves alternate, petioled, stipulate. Flowers irregular. Sepals 5, produced at the base. Petals unequal, spreading, lowermost often larger, spurred or gibbous at the base. Anthers 5, connective, flat, produced into a thin membrane; the lower often spurred. Style, capitate. Capsule, 3-valved, with a parietal placenta on each valve.—*Handbook of New Zealand Flora, p. 16.*

Description, etc.—A large British and widely diffused genus in all temperate climates, of which several species produce two forms of flowers. The British species consists of two groups, those with flowers growing from the crown of the apparent stemless plant, and represented by *V. odorata,* the Sweet Violet, and its varieties; and those with the stems evident, and flowers springing from the axils of the leaves, which are alternate, on more or less branched stems, the latter group represented by *V. canina,* the Dog Violet, and *V. tricolor,* the Pansy. The New Zealand species are (1). *V. filicaulis;* (2). *V. Lyallii;* and (3). *V. Cunninghamii.*

1. VIOLA FILICAULIS (*Hook., F.*) The Thread Stemmed Violet.

Specific Character.—Very slender, perfectly glabrous. Stems filiform, prostrate or creeping. Leaves alternate, orbicular-cordate, or broadly ovate-cordate, obtuse or acute, obtusely crenate; petioles 1–3 in. long; stipules lacerate, the teeth filiform, tipped with a gland; peduncles very slender, flowered; bracts subulate, more or less lacerate like the stipules. Flowers very pale blue, ¼–⅜ in diam. Sepals linear-lanceolate, acuminate. Spur very short. *Handbook of New Zealand Flora, p. 16.*

Description, etc.—Fig. 1, Plate No. 7.—The "NATIVE VIOLET."—This little plant is common to both the Northern and Middle Islands as far south as Otago, and is abundant in many districts in damp situations, but in some localities it has nearly disappeared, particularly in light soils. It has no fragrance, and cannot, as a plant, compare with the European species for size or appearance, but it claims the distinction of being a member of the family, and therefore is worthy of our attention and regard. It has been introduced into many colonial gardens, and is much cherished for its simple beauty. The species belonging to the order Violarieæ, and best known, are the Violet and the Heartsease, or Pansy. The *Viola odorata,* or common Sweet Violet is a favourite flower in every garden, and has a delightful fragrance. It is a native of Britain, indeed of the whole of Europe, and part of Asia, extending it is said even to China and Japan. It is generally believed that this species is the Violet of the ancients, as described by Dioscorides, who recommends it for its medicinal virtues, as well as for its beauty and fragrance. There are numerous varieties of this species, of these some are white, purple, and blue; and some of all these are double-flowering. The most interesting, and those most generally cultivated, are the varieties known as the Neapolitan and Russian. The Neapolitan Violet is a pale blue, fragrant, but its chief recommendation consists in its generous nature of flowering during winter. The Sweet Violets are variable in colour, the flowers being sometimes blue, while sometimes they are white or lilac. The white variety is both the earliest and latest in blooming, and is very sweet scented. The Dog Violets are perhaps so called from their want of scent, and so relegated to the dogs, as a worthless commodity. The endless varieties of Heartsease or Pansy, are derived from the admixture of the cornfield weed, *V. tricolor,* with the alien species *V. altiaca,* from Tartary, and *V. grandiflora,* from Switzerland.

The Violet has ever been with poets a favourite flower, and a subject of poesy. Roman dames perfumed their baths with its fragrance, and its abundant presence at ancient regal banquets filled the air with overpowering incense. The great Napoleon accepted it as the emblem of his Imperial dynasty, and when he, who thought to rule the world, was banished to Elba, "To return in Spring," was the meaning it conveyed to his adherents. The name of Viola is said to be derived from Io, the daughter of Machus, King of Argos, who was transformed into a cow by Jupiter, and is fabled to have eaten Violets as the first food she took. Bunches of Violets, if laid away when fresh, in the pockets or sleeves of dresses, impart a delicious odour of the flower. The blossoms must be quite dry, and should be removed when they become scentless. It is said that Josephine's boudoir at Malmaison is impregnated to this day with the odour of Violets, owing to the quantities of that flower with which the room was kept constantly supplied.

> "But sweeter than the lids of Juno's eyes,
> Or Cytherea's breath."
> —*Winter's Tale.*

OTHER SPECIES OF VIOLA.

2. V. LYALLII.

A plant entirely similar to *V. filicaulis,* in most respects, but the stipules and bracts are generally more green and always entire, usually obtuse, and the flowers are smaller. It is found in various places in both the Northern and Middle Island.

3. V. CUNNINGHAMII.

A plant very variable in size, stem short, much branched, often thickening into a short woody stock. Leaves tufted on the top of the root or stem, or on very short branches from it. Peduncles slender. Flowers $\frac{1}{3}-\frac{2}{3}$ inches in diameter, and pale blue, scentless. Very common in moist places from the middle of the Northern Island, southwards, ascending to 5,000 feet. It is also found in the Middle Island and in Tasmania.

GENUS II.

MELICYTUS (*Forst.*) The Honey Trees.

GENERAL CHARACTER.—Shrubs, with short petioled, toothed, minute stipuled leaves. Flowers axillary, fascicled, small, regular, almost unisexual or polygamous. Sepals 5. Petals 5. short, spathulate, spreading. Anthers 5, free; connective produced into a membrane, and furnished with a scale at the back. Style 3–6-fid, or with a discoid stigma. Berry, with a few or many angled seeds, on 3–6 placentas.—*Handbook of New Zealand Flora, p. 17.*

DESCRIPTION, etc.—This genus is confined to New Zealand, Norfolk Island, and belongs to the equal-petaled division of the order. The genus consists of four species:

(1.) *M. ramiflorus;* (2.) *M. macrophyllus;* (3.) *M. lanceolatus;* (4) *M. micranthus,* large woody shrubs or small trees, with long, smooth, serrated, short-stalked leaves, and little bundles of small fragrant flowers on the branches, having one or more bracts. The flowers are usually of separate sexes, and borne on distinct plants; they are said to contain abundant supplies of honey. The name of the genus means literally "Honey receptacles," due to the secretion of abundant nectar in the flowers of the plants.

I. MELICYTUS RAMIFLORUS (*Forst.*) The Flowering-branched Melicytus.

Specific Character.—A glabrous, white-barked small tree, or large shrub, 20–30 feet high; trunk often angular, branches brittle. Leaves alternate, 4–5 in. long, oblong-lanceolate, accuminate, serrate with small obtuse teeth, sometimes obscurely so; petioles slender; stipules deciduous. Flowers small, in fascicles on the branches; peduncles slender ¼–⅓ in. long, with 2 minute bracts. Flowers minute ⅛ in. diam. Calyx lobes spreading, green. Anthers obtuse; stigma almost sessile, 6-lobed. Berry small, ⅕ in. diam.—***Handbook New Zealand Flora. p. 17.***

Description, etc.—Fig. 2., Plate No. 7—The "Hinahina," or "Mahoe."—This shrub, or small tree is abundant throughout the Islands, in lowland districts. The wood is soft, of a white colour and useless for constructive purposes, though occasionally it is used for temporary fencing; and is burnt as firewood. The tree sometimes attains a height of thirty feet, but the trunk rarely exceeds two feet in diameter. Horses and cattle are greedily fond of the pale green foliage, and eat it without harm to themselves. The tree produces enormous numbers of flowers of a greenish-yellow hue, conspicuous by their mass; they are fragrant and afford an abundant supply of nectar The flowers are polygamous, both male and female, growing on the same tree. When the "Hina-hina," or "Mahoe," as the tree is called by the natives in some districts, is in berry, it is much frequented by the small native birds, who feed upon the fruit with which it is densely covered. The berries are about the size of a pea, a bright violet colour in the light, but appear nearly black in the shade. In flavour they are slightly sweet but not very palatable. The tree has been planted in shrubberies with success, and is raised by nurserymen for sale, it being deemed worthy of propagation. Young trees transplanted from the woods take kindly to new homes, provided that they have good shelter. The Hina-hina is not known to possess any medicinal virtues; the berries are innocuous, and are eaten by the natives.

OTHER SPECIES OF MELICYTUS.

2. M. MACROPHYLLUS (*A. Cunn.*)

A large glabrous bush 4–7 feet high, with a pale brown bark, and leaves rather smaller, but more coriaceous, (leathery) and broader than those of *M. ramiflorus.* The

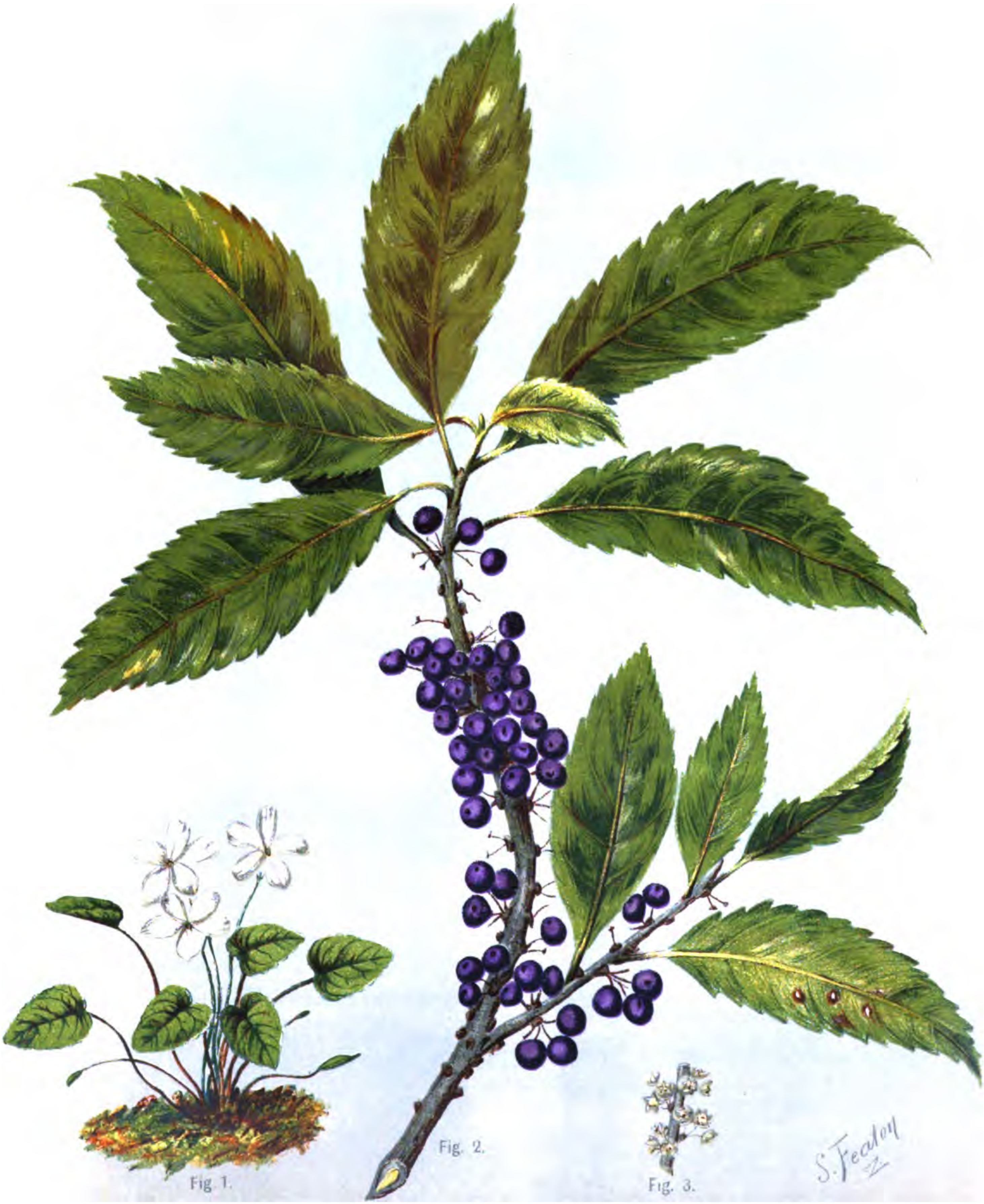


Fig. 1.
Fig. 2.
Fig. 3.
S. Fearon

COPYRIGHT.

LOCK & COUSI [illegible]

1. **VIOLA FILICAULIS.**—**Native Violet.** 2. **MELICYTUS RAMIFLORUS.**—Hinahina. 3. **Flower of Hinahina.**

flowers are twice as large as those of *M. ramiflorus*, and hang in fascicles of 4 or 6, on the branches; they are yellowish in their lower parts, the tips of their petals having a purple tinge. The berries are $\frac{1}{4}$ of an inch in diameter. As far as is known, this plant is confined to the northern part of the Northern Island, and is easily distinguished from *M. ramiflorus* by its coarser habit, broader and more leathery leaves, and larger flowers and berries.

3. M. LANCEOLATUS (*Hook.*, *F.*)

A slender shrub, or small tree, 10–12 feet high, with brittle branches and dark-brown bark. The leaves are from 4–7 inches long. The flowers are small, two or three together. The berry is oblong, and $\frac{1}{6}$ of an inch in diameter. It is found on the West Coast of the Northern Island.

4. M. MICRANTHUS (*Hook.*, *F.*)

A small rigid shrub, with tortuous branches, covered with grey or brown bark. The leaves are small and scattered, $\frac{1}{3}$–$\frac{1}{2}$ an inch long. The flowers are unisexual, very minute, and grow on the axils of the branches. The berry is as small as a mustard seed. The shrub is found on the East Coast and in the interior of the Northern Island, and in the northern part of the Middle Island. It is a plant of very different habit and appearance from any of the preceding species.

GENUS III.

HYMENANTHERA (*Brown.*) The Hymenanthera.

Generic Character.—Woody shrubs, with alternate or fascicled, entire or toothed, minutely stipuled leaves, with small axillary, solitary, fascicled, sometimes unisexual flowers. Sepals, 5. Petals, 5, short. Anthers, sessile, connate, connective, produced into a membrane, and furnished with a scale at the back. Style short, with a 2-lobed stigma. Berry small with 2 or few globose seeds on 2 placentas.—*Handbook of New Zealand Flora, p. 18.*

Description, etc.—A small genus, native also of Norfolk Island, Tasmania, and South Eastern Australia; the species are very variable in foliage. The genus is named from Hymen, the god of marriage, in consequence of the anthers being connate, or united in pairs.

1. HYMENANTHERA CRASSIFOLIA *(Hook., F.)* The Thick-leaved Hymenanthera.

Specific Character.—A small shrub, 2–4 feet high, rigid, stout, tortuous branches, rarely sending out straight shoots. Branchlets, pubescent. Bark, white. Leaves, very variable, thickly coriaceous, common form linear-spathulate, 2–3 inches long, but on young shoots often larger, broader, sinuate or toothed; and in older, shorter, obtuse, veined, when dry. Petioles, short. Stipules very minute and deciduous. Flowers very small, solitary or few together, axillary. Pedicels short, stout, curved, with one concave appressed bract. Sepals, orbicular, erose or ciliolate. Petals, linear-oblong. Anthers recurved, connate into a membranous lobed tube, the lobes ciliolate. Berries ¼ in. diameter, blue-purple.—*Handbook of New Zealand Flora, p. 18.*

Description, etc.—This small maritime shrub is found in certain localities in the Northern Island, but is not common, the only places reported being in the northern portion of the Auckland provincial district, and again in the Wellington district at Cape Palliser. In the Middle Island it is known only at Nelson. The berries, which are large in proportion to the size of the shrub, are succulent, but not edible. In growth, it is of a tortuous habit, rarely sending out straight shoots, and has white bark. The genus is common to a portion of Australia.

CHAPTER V.

ORDER V.—PITTOSPOREÆ. The Pitchy Seed Family.

CHARACTER OF THE ORDER.—Shrubs or trees with alternate or whorled exstipulate evergreen leaves, and regular flowers. Sepals 5, imbricate. Petals long, with erect claws and spreading limbs, imbricate. Stamens 5, free, hypogynous, erect, with oblong or sagittate anthers. Ovary 1 or 2, rarely 3–5 celled (often imperfectly) with a short or long style. Ovules many, placentas attached to the septa. Capsule usually bursting by woody valves, which bear the placentas on the middle. Seeds with a minute embryo in hard albumen.—*Handbook of New Zealand Flora, p. 18.*

DESCRIPTION OF THE ORDER.—

THIS order, which is a small one, is found chiefly in Australia. It is represented only by *Pittosporum* in India and its islands; the isles of the Pacific, and on the continent of Africa. In America it is unknown. In New Zealand it consists of one genus only, divided into more than twelve species. The name of the order is due to the pitchy, or glutinous matter which envelopes the ovules, or seeds.

GENUS I.

PITTOSPORUM. *(Linn.)* The Pittosporum.

GENERIC CHARACTER.—Flowers often polygamous. Sepals free. Petals usually recurved. Filaments subulate. Ovary perfectly, or imperfectly 2–5 celled. Capsule woody or coriaceous. Seeds immersed in a transparent gluten.—*Handbook of New Zealand Flora, p. 18.*

DESCRIPTION, etc.—In New Zealand this genus embraces the following species, besides a few others which have been added of late years:—(1.) P. TENUIFOLIUM;

(2.) P. Colensoi; (3.) P. patulum; (4.) P. reflexum; (5.) P. rigidum; (6.) P. obcordatum; (7.) P. fasciculatum; (8.) P. crassifolium; (9.) P. umbellatum; (10.) P. eugenioides; (11.) P. cornifolium; (12.) P. pimeleoides. Of these, the first six have alternate leaves, with flowers solitary or two together, axillary; the remainder have likewise alternate leaves, excepting the last two, which have their leaves whorled; the flowers of these latter are either fascicled, corymbose, or panicled.

1. PITTOSPORUM TENUIFOLIUM (*Banks & Sol.*) The Thin-leaved Pittosporum.

Specific Character.—A bush or small tree, 20–40 ft. high, with slender trunk; young shoots and leaves often pubescent. Leaves 1–2 in. long, broadly oblong or elliptic-obovate, obtuse, acute or accuminate, quite entire, undulate, rather membranous, glabrous or pubescent on the mid-rib. Petiole short. Flowers axillary, solitary, on curved pubescent peduncles as long or longer than the calyx, variable in size ¼–⅔ in. long. Sepals very variable in form and shape, from broadly-ovate to linear-oblong, silky or glabrous. Petals dark purple. Ovary pubescent. Capsule size of a small nut, usually 3-valved, broadly-obovoid, downy when young, glabrous and rugose when old.—*Handbook of New Zealand Flora, p. 19.*

Description, etc.—Fig 1, Plate No. 8.—This small evergreen tree, known by the native names of "Kowhiwhi," or "Mauparik," abounds on the eastern coasts of both Islands. It does not attain any great height, and seldom exceeds from 10–12 inches in the thickness of its trunk. It is found in almost any little clump of bush, and presents a very pleasing and neat appearance. The wood is white, and adapted for turnery of a light character, otherwise it is valueless. Even as firewood it is despised, and bears the all too suggestive name of "Bucket of Water Wood," so little is it calculated by its combustive properties to enliven the domestic hearth. As a garden hedge, it forms one of the best, and is very ornamental. As an addition to a shrubbery it is pretty and attractive. Young plants may be purchased from nurserymen, in common with other Pittosporads, or they can be easily transplanted from their native homes in the bush. The genus *Pittosporum* is abundant in Australia, and supplies of seedlings are, in each planting season, introduced into New Zealand for sale as garden shrubs, and are much prized. There is no reason whatever that our own native plants should not be as much esteemed and cultivated; they are equally as suitable for garden purposes, and quite as ornamental. The Kowhiwhi blossoms in early summer, the flowers are solitary, and of a brownish-crimson colour. The capsule, or seed pod, is about the size of a small nut, and contains the seeds, which are immersed in hard albumen. When ripe, the woody capsule bursts open and discloses the seed.

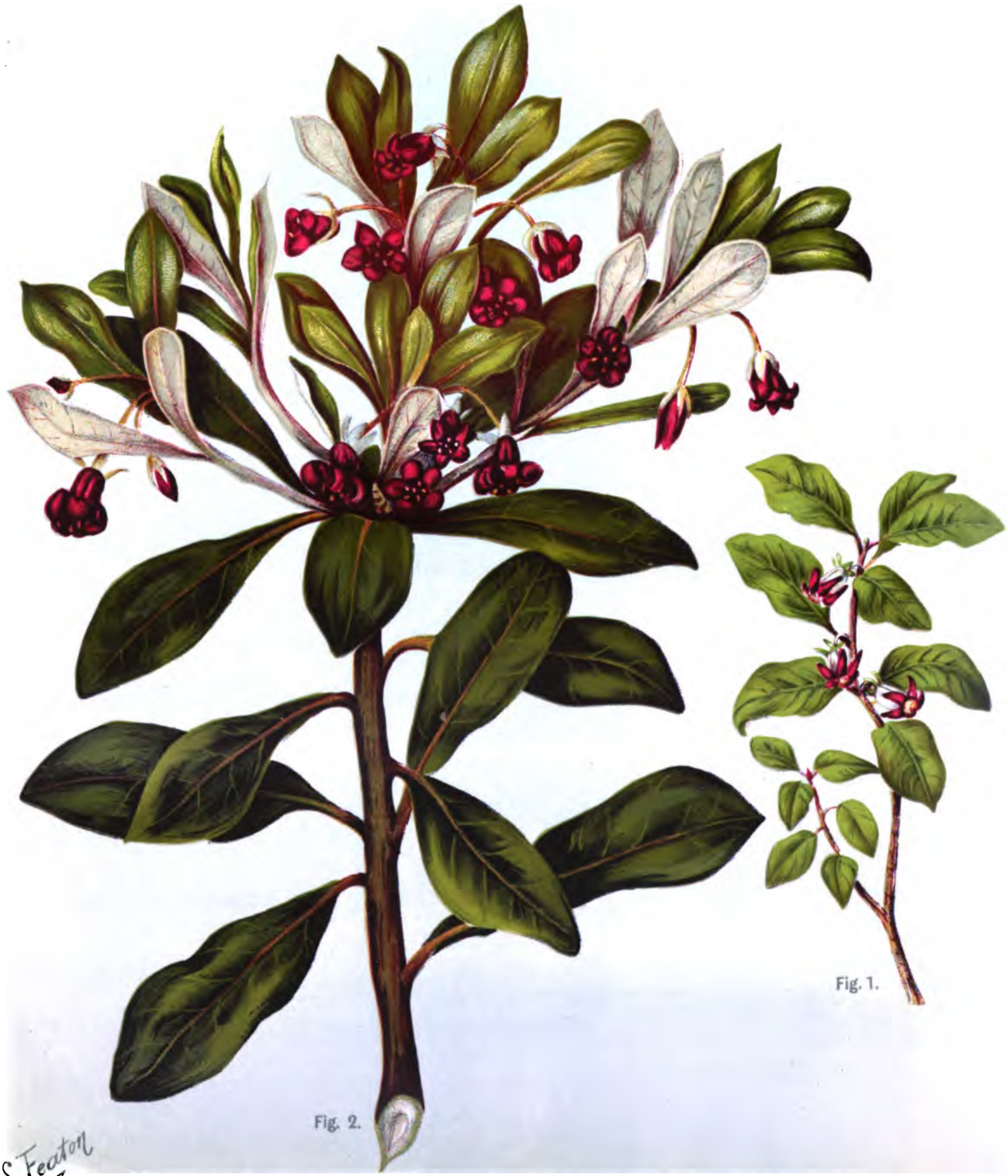


Fig. 1.

Fig. 2.

S. Featon

Bock & Cousins, Chromo-Litho

Copyright.

1. KOWHIWHI.—Pittosporum tenuifolium. 2. KARO.—Pittosporum Crassifolium.

2. PITTOSPORUM COLENSOI (*Hook., F.*) Mr. Colenso's Pittosporum.

Specific Character.—A small tree very closely allied to *P. tenuifolium*, if not a variety of it; but the leaves are larger, more acute, coriaceous, and not undulated; the peduncles shorter than the sepals, both of which are always glabrous; and the scarious bracts at the base of the peduncles are very persistent. The fruit is also smaller and rounder.—*Handbook of New Zealand Flora, p. 19.*

Description, etc.—This species is common only to the Northern Island, and is found on the East coast and in the interior. It is closely allied to *P. tenuifolium*, and is, in consequence, difficult to identify; more especially as, in some specimens, the leaves are almost as undulate as *P. tenuifolium*. As in the rest of the genus, the wood is of little value.

3. PITTOSPORUM PATULUM (*Hook., F.*) The Spreading Pittosporum.

Specific Character. — Branches stout, glabrous; branchlets puberulous. Leaves patent, or recurved, 1–1½ in. long, ⅛ in. broad, very narrow, linear-oblong, narrowed at the base, obtuse, crenate-serrate, very coriaceous and shining. Fruit globose, or broader than long, woody, ⅓ in. diameter, compressed, on a short, stout, axillary peduncle.—*Handbook of New Zealand Flora, p. 19.*

Description, etc.—This is an Alpine species, and grows on the Wairau Mountains in the Nelson district, at an altitude of 5,000 feet. It is a most distinct-looking species, but does not appear to be much known.

4. PITTOSPORUM REFLEXUM (*R. Cunn.*) The Recurved-leaved Pittosporum.

Specific Character.—A small slender much branched shrub, 2–3 ft. high, with almost filiform silky pubescent twigs. Leaves numerous, patent, recurved, very slender linear lanceolate, acuminate, membranous, quite entire ¾–1½ in. long, ⅛ in. broad. Flowers not seen. Peduncles solitary, terminal, short curved, pilose, 1–2 flowered. Ovary hirsute. Capsule ovoid, acuminate, ⅓ in. long, compressed, 2-valved, valves with the tips recurved.—*Handbook of New Zealand Flora, p. 20.*

Description, etc.—This small and slender species is indigenous to the Auckland district, north of the Bay of Islands, and is mostly to be found in thickets. It is considered valueless.

OTHER SPECIES OF PITTOSPORUM.

5. P. RIGIDUM (*Hook., F.*) The Rigid Pittosporum.

A rigid, much-branched shrub; branches tortuous, woody, stout, spreading. Leaves small, shining, ½ in. long. Flowers axillary, solitary. Petals, dingy purple, nearly as long as the leaves. Found in the Northern Island near the Waikare Lake, and on the Ruahine Mountains; likewise in the Middle Island, on the Nelson Mountains.

6. P. OBCORDATUM (*Raoul.*) The Heart-shape leaved Pittosporum.

A shrub or small tree, glabrous, with divaricating, rather slender branches. Bark pale, leaves small, ⅓ in. long, remote or 2 or 3 together, rounded or obcordate, sinuate, crenate or quite entire, suddenly contracted into a very short petiole, rather coriaceous; nerves obscure. Flowers $\frac{1}{4}$ in. long, solitary or two together, on short puberulous peduncles, white; sepals very slender; petals narrow-linear; ovary pubescent. Fruit unknown. This species is found in the Middle Island in shady woods, near Akaroa in the Canterbury district, and is the only white-flowered species.

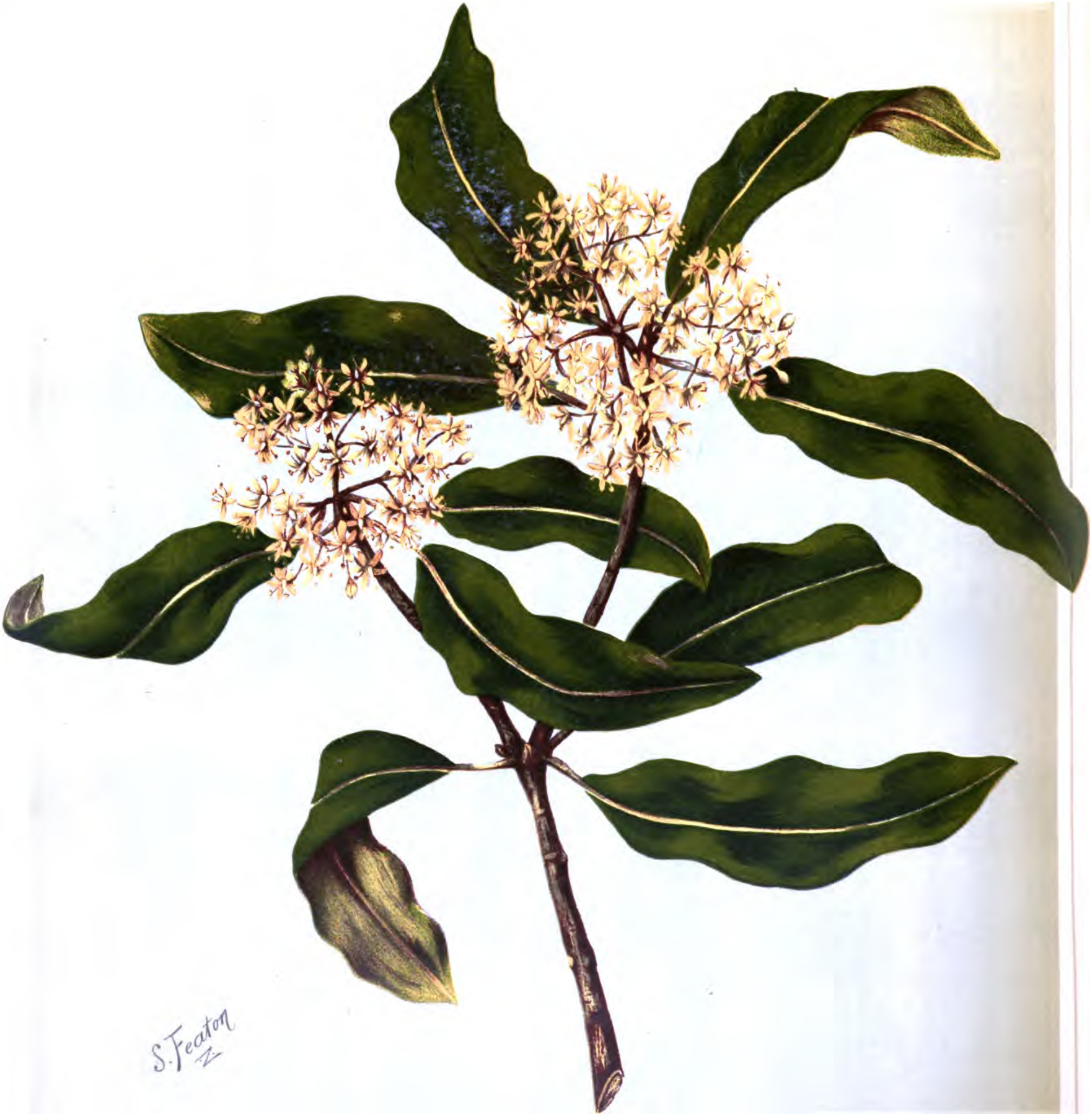
7. P. FASCICULATUM (*Hook., F.*) The Fascicled Pittosporum.

A branching shrub with glabrous leaves and branches, and inflorescence tomentose. Leaves alternate, coriaceous, obovate-oblong, acute, quite entire, pale beneath; petioles $\frac{1}{3}$ in. long. Flowers densely fascicled, axillary and terminal. Sepals ovate lanceolate. Petals linear-oblong, deep purple, $\frac{1}{3}$ in. long. Capsule on a curved pedicel, $\frac{1}{2}$–$\frac{3}{4}$ in. long. like that of *P. tenuifolium*, 2–3-valved. Found in the Northern Island at Lake Taupo, in the Middle Island at Chalky Bay, and in the Otago district, but not common. This species is closely allied to *P. tenuifolium;* but the flowers are densely fascicled, and the leaves are rather longer, and more like those of *P. Colensoi.*

8. PITTOSPORUM CRASSIFOLIUM (*Banks & Sol.*) The Thick-leaved Pittosporum.

SPECIFIC CHARACTER.—A shrub, or small tree; branches erect; twigs, leaves below, petioles and inflorescenee densely clothed with a thick white tomentum. Leaves alternate, narrow-obovate, or oblong-obtuse, quite entire, 2–3 in. long, very coriaceous, margins recurved. Inflorescence terminal, usually a peduncled, simple umbel, sometimes reduced to a fascicle, or a single flower; bracts broadly ovate, ciliate, imbricate. Flowers nearly $\frac{1}{2}$ in. long. Sepals linear-oblong, with white tomentum. Petals narrow, deep purple. Capsule very variable in size, nearly globose, 2–4-lobed and valved, downy.—*Handbook of New Zealand Flora, p. 20.*

DESCRIPTION, etc.—Fig. 2, Plate No. 8.—The "KARO."—This species is common on the coast line throughout the Northern Island, and attains a height of from thirty to forty feet, with a trunk from one to two feet in diameter. The wood is white and compact, but worthless for all purposes where durability is required. It is used in turnery, and is difficult of combustion. The foliage is of a dark green, but the young leaves are lighter in colour, and covered at the back with a thick white cottony coat, which adds much to the beauty of the tree, and forms a varied and beautiful background to the very pretty umbelled crimson flowers, which mingle with it. This tree has been introduced successfully into many gardens, and affords a most interesting and excellent addition to the plantation around the homestead. In common with some of the other Pittosporads, it is known to the settlers as one of the "Turpentine" trees; which are probably so called on account of the gluten, in which the seeds in the capsule are immersed, emitting a peculiar odour, when expressed. The bark of this species is black.

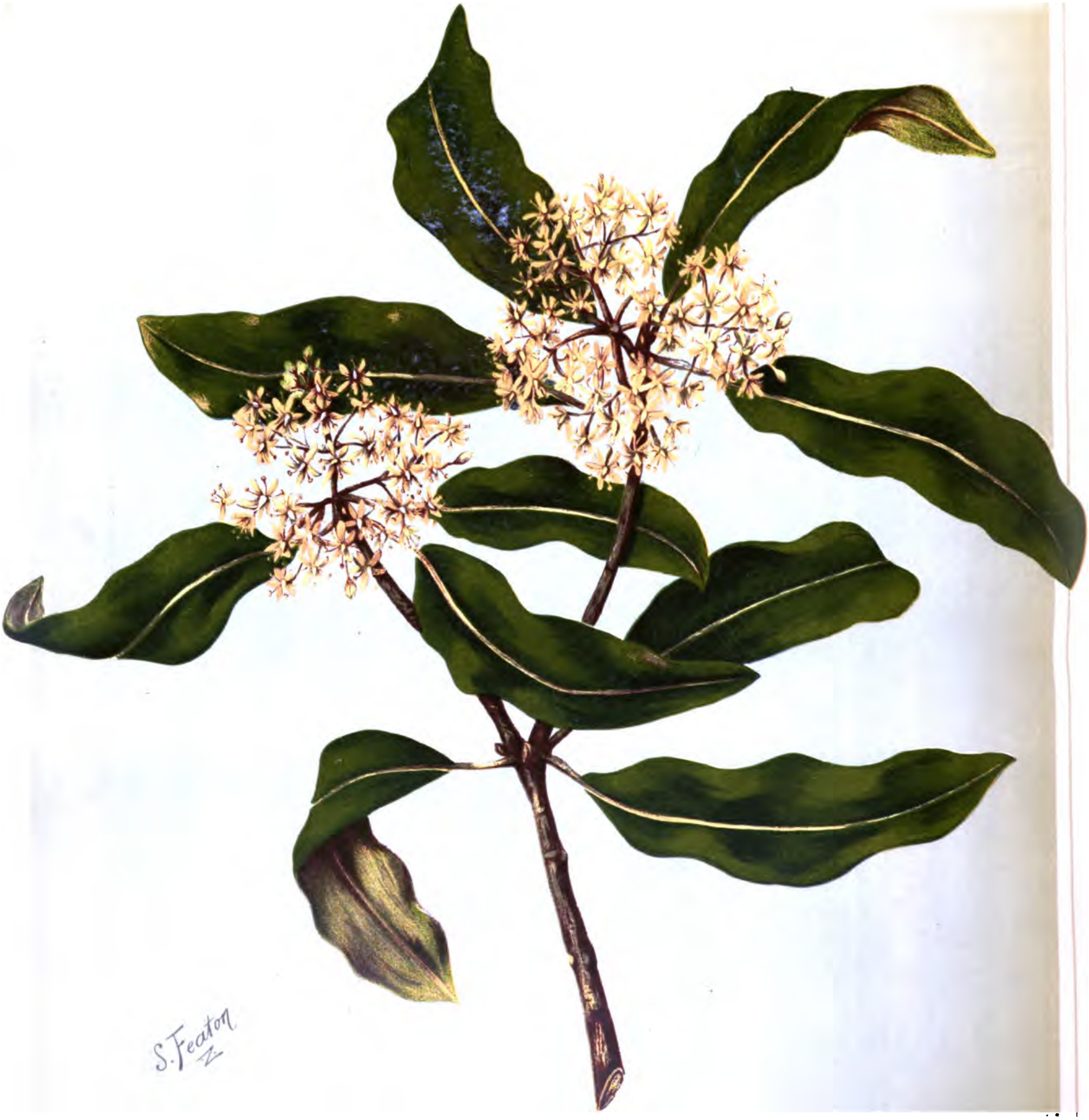


COPYRIGHT.

BOCK & COUSINS CHROMO-LITHO

TARATA.—Pittosporum Eugenioides.

Plate No. 9.



Copyright.

Bock & Cousins Chromo-Litho

TARATA.—Pittosporum Eugenioides.

9. PITTOSPORUM UMBELLATUM (*Banks & Sol.*) The Umbelled Pittosporum.

Specific Character.—A small tree, 20–30 ft. high, everywhere glabrous, except the under sides and petioles of the young leaves, peduncles, and calyces, which are covered with silky fulvous hairs; branches whorled. Leaves alternate, coriaceous, bright green, 2–3 in. long, obovate, or lanceolate-oblong, obtuse or acute, quite entire, narrowed into petioles ⅓–½ in. long. Flowers numerous, rather large, nearly ½ in. long in terminal umbels, or corymbs. Peduncles slender, 1 in. long, sometimes only ½ an inch. Sepals ovate-lanceolate. Petals linear-oblong, obtuse. Ovary pubescent. Capsule rounded 4-lobed, size of a hazel nut, 2-valved, valves woody, granulated on the surface.—*Handbook of New Zealand Flora, p. 21.*

Description, etc.—This beautiful species is indigenous to the Northern Island only, and is common about the Bay of Islands and neighbourhood. To the natives living in that locality it is known as the "Karo." Like other members of its genus, it is an evergreen, and is worthy of a place in our gardens and hedgerows. It attains, generally, a height of from 20–30 feet, and is very ornamental.

10. PITTOSPORUM EUGENIOIDES (*A. Cunn.*) The Eugenia-like Pittosporum.

Specific Character.—A small branching tree, 20–30 ft. high, everywhere quite glabrous, except the inflorescence, and at times the youngest leaves, which may have a few scattered silky hairs; branches often whorled. Leaves 2–4 in. long, usually elliptical, acute, narrowed into long petioles, rarely broader and obovate, quite entire, undulated or crisped, rather coriaceous with numerous fine veins. Flowers ¼–⅓ in. diameter, fragrant, diœcious (more or less), males with large anthers and longer filaments, collected in branched, many-flowered corymbs, with diverging, slender peduncles and pedicels; bracteoles setaceous. Sepals very variable, ovate, acuminate, glabrous. Petals narrow and spreading, recurved. Capsules numerous, small, ¼ in. long, ovoid, acute, glabrous, 2–3-valved.—*Handbook of New Zealand Flora, p. 21.*

Description, etc.—Plate No. 9.—The "TARATA."—This elegant tree is found on the East coast of both Islands, as far south as Otago. It attains a height of from twenty to thirty feet, and has a stem from twelve to eighteen inches in diameter. It is known to the settlers in some parts as "Lemon Wood." In growth it is very compact, and has a rich, dark-green foliage. When in bloom in November and December, displaying its profuse masses of pale golden flowers, it is very pretty. The flowers possess a sweet and deliciously-honied fragrance, which imparts an agreeable perfume to the surrounding atmosphere. From an artistic point of view, the happy combination of light and shade is exceedingly striking. This tree has a great attraction for bees, who reap an abundant harvest from the large quantity of honey secreted in its flowers; To these visits, the plant being (more or less) diœcious, or some bearing both male and female flowers on the same tree, the fertilisation of the seed is due. The wood is white and compact, but very difficult of combustion, and worthless for all purposes where durability is desired. It is adapted for turnery purposes, and light furniture use. Our plate represents the male flowers, the anthers of which are larger, and the filaments longer, than those of the female. Of the several species the "Tarata" (*P. eugenioides*), and the "Karo" (*P. crassifolium*), are, perhaps, the most showy plants. The subject of our notice is well worthy of horticultural care; and in our shrubberies, or home paddocks, would form an ornate and beautiful tree. The foliage is eagerly eaten by cattle, and it is in no way pernicious.

11. PITTOSPORUM CORNIFOLIUM (*A. Cunn.*) The Cornel-leaved Pittosporum.

Specific Character.—A small slender shrub, 2–4 ft. high, with forked or whorled branches, everywhere glabrous, except the young shoots and inflorescence, which present a few long silky hairs. Leaves 1–2 in. long, whorled, obovate, or elliptic-lanceolate, shortly petioled, quite entire and glabrous, coriaceous. Flowers polygamous, on very slender terminal 1–2 flowered peduncles, dingy red, ⅓ in. long. Peduncles pilose, of the males ½–1 in; female ¼–½ in. long. Sepals very narrow, subulate. Petals as narrow with slender tips. Capsule ½ in. long, broadly obovate, or obcordate, compressed; valves yellow inside, coriaceous. Seeds large.—*Handbook of New Zealand Flora, p. 21.*

Description, etc., Plate No. 10.—The "PIRIPIRI."—This remarkable and interesting plant is peculiar to the eastern and southern coasts of the Northern Island, where it is common; always, or nearly so, growing epiphytically on trunks of forest trees. It is not at all unusual to find this plant growing out of the centre of a clump of ***Astelia;*** which again, in its turn, clings to the stalwart trunk of a lofty "Pukatea," (***Atherosperma Novæ Zelandiæ***), or other forest denizen. The flowers are rather insignificant, of a dingy crimson colour; but possess a fragrance. The capsule, or seed pod, is very singular in structure. The seeds are blackish purple, and lie embedded in a thick yellow gluten within the capsule, which, when open, forms two valves, or flaps, of a bright orange colour, producing a very showy effect. As soon as the gluten dries the the seeds become detached, and fall. Our plate pourtrays accurately the various stages of the seed receptacles during the ripening process, which reaches completion in the month of July.

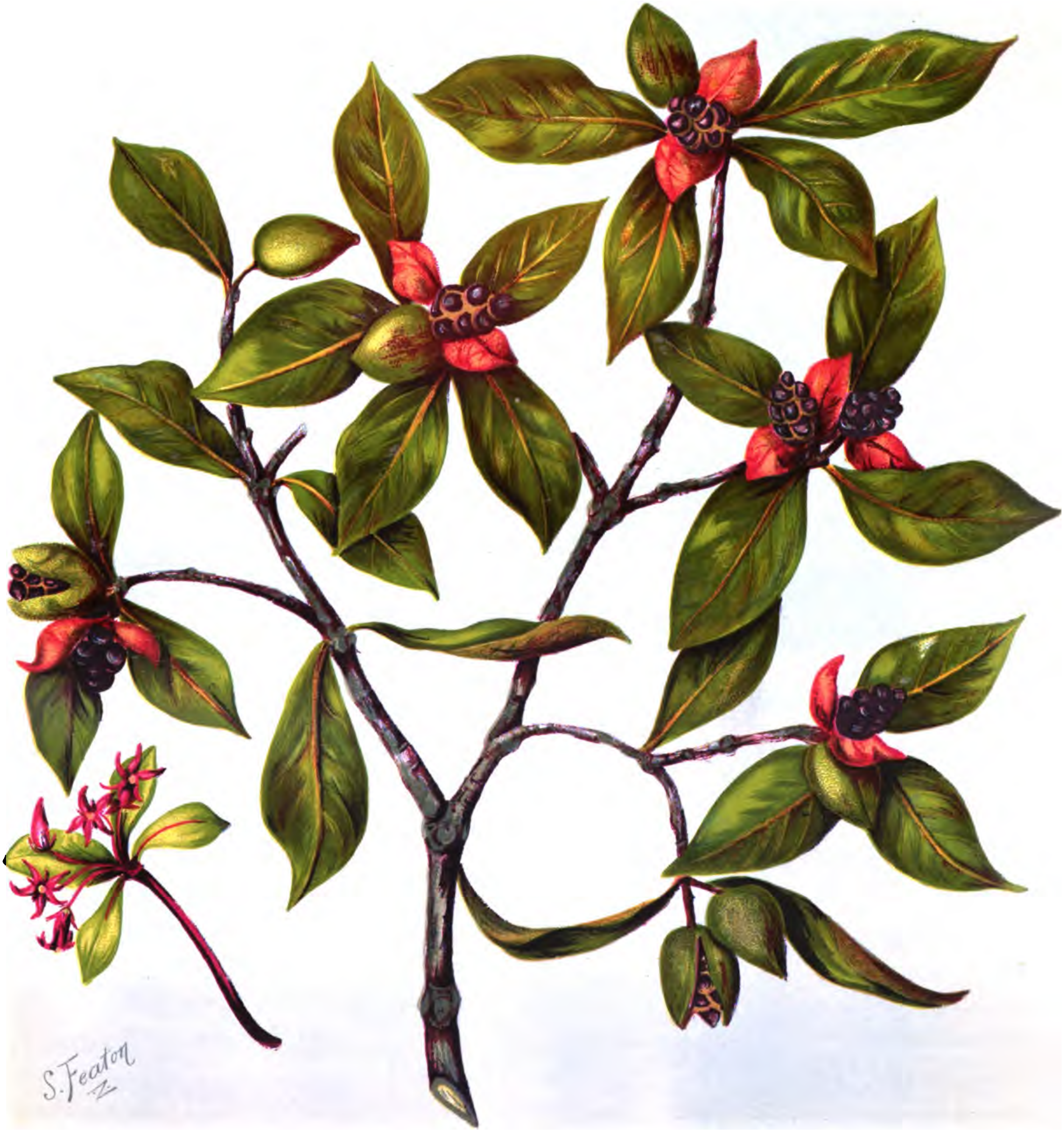
OTHER SPECIES OF PITTOSPORUM.

12. P. PIMELEOIDES (*R. Cunn.*)

A very slender, branched shrub, 3–5 ft. high. Leaves spreading, whorled, 1 in. long, $\frac{1}{4}-\frac{1}{3}$ in. wide, rather membranous. Flowers small, terminal, solitary or few; peduncles, 1-flowered, very slender, $\frac{1}{4}$–1 in. long. Petals very slender, yellow-red. Capsule small, quite like that of *P. reflexum.* This shrub is indigenous to the Northern Island, and is found on dry hills at the Bay of Islands.

13. P. BUCHANANI (*Hook., F.*)

A rambling, branched shrub; 10–12 ft. high; young shoots and leaves silky-pubescent. Leaves scattered, 2–5 in. long, flat, quite entire, glabrous; shining green above, paler below. Sepals long, obtuse. Petals linear, dark purple. Found near Mount Tongariro, and is in cultivation in Wellington (*Buchanan*).



COPYRIGHT.

BOCK & COUSINS, CHROMO-LITHO

PIRIPIRI.—Pittosporum cornifolium.

CHAPTER VI.

ORDER VI.—CARYOPHYLLEÆ. The Carnation and Chickweed Family.

CHARACTER OF THE ORDER.—Herbs with opposite, quite entire or minutely serrulate leaves. Flowers hermaphrodite. Sepals 4 or 5, free or connate, imbricate. Petals 4 or 5, or 0, hypogynous or perigynous. Stamens, 4, 5, 8, or 10 inserted with the petals, sometimes seated on, or between the lobes of an annular disk. Ovary 1-celled, bearing many (rarely few) ovules on a free central or basal placenta. Styles 2-5, free or connate, stigmatose at the apex or inner face. Capsule many-seeded, splitting into as many, or twice as many, valves as styles. Seeds with farinaceous albumen, and a usually curved terete embryo.—*Handbook of New Zealand Flora, p. 22.*

DESCRIPTION OF THE ORDER.—

A VERY large order, abounding in temperate and cold climates A few foreign members of it are shrubby in habit. The plants of this order inhabit mountains, hedges, rocks, and waste places. Humboldt says that the Cloveworts (the Chickweed Family) constitute $\frac{1}{22}$ of the flowering plants of France, $\frac{1}{27}$ of those of Germany, $\frac{1}{17}$ of those of Lapland and $\frac{1}{72}$ of those of North America. The order has no very marked properties. Some say that the principle called *saponine*, which is found in some of the plants, has poisonous qualities. There are three sub-orders:—(1.) SILENEÆ, the Pink tribe, with united sepals opposite the stamens, when the latter are of the same number; (2.) ALSINEÆ, the Chickweed tribe, with separate sepals, bearing the same relation to the stamens as in SILENEÆ; (3.) MOLLUGINEÆ, the Carpetweed tribe, in which the petals are wanting, and the stamens are alternate with the sepals when of the same number. There are some showy flowers in the order, such as Pinks and Carnations; but the greater number are mere weeds. The Clove Pink, *Dianthus caryophyllus*, is the origin of all the cultivated varieties of Carnations known as Picotees, Bizarres and Flakes.

The common Chickweed, (*Stellaria media*) and Spurrey, (*Spergula arvensis*), used as fodder for sheep, are other examples. There are about sixty genera, and one thousand one hundred species. The plants of this order are usually insipid. In New Zealand the order is represented by:—Tribe 1, SILENEÆ, sepals connate into a tubular calyx; Genus 1, *Gypsophila*. Tribe 2, ALSINEÆ, sepals free; Genus 2; *Stellaria;* 3, *Colobanthus;* 4, *Spergularia.* There are several Caryophylleous weeds introduced into New Zealand, especially from Europe; the principal of which are *Polycarpon tetraphyllum*, a small tufted annual, with minute green flowers; *Cerastium*, a genus of very common, erect or straggling, hairy weeds, with white flowers; and *Spergula arvensis*, an annual bearing whorls of linear leaves, and cymes of white flowers.

GENUS I.

GYPSOPHILA (*Linn.*) The Gypsophila.

GENERIC CHARACTER.—Annual (or perennial) herbs, with small paniculate flowers. Calyx more or less campanulate, 5-fid, usually 5-nerved. Petals 5, with a narrow claw, and entire or emarginate blade. Stamens 10, at the base of a small torus. Ovary, many-ovuled. Styles 2. Capsules ovoid or globose, 4-5-valved. Seeds laterally attached.—*Handbook of New Zealand Flora, p. 22.*

DESCRIPTION, etc.—A large South European genus of annual or perennial evergreen herbaceous plants, belonging to the *Alsineous* division of the order. The species, which are numerous, have leaves like those of the Pink; and small white or pink flowers, which are usually disposed in diffused panicles. They inhabit various parts of Europe and Asia, growing mostly in rocky or stony places, especially in a limestone soil. Some of them are occasionally cultivated as border plants, and on rockeries. It is represented in the Southern Hemisphere by only one species; and this is indigenous to New Zealand. The name of this genus is due to its plants delighting to grow in a soil composed largely of gypsum.

1. GYPSOPHILA TUBULOSA (*Boiss.*) The Tubular Gypsophila.

SPECIFIC CHARACTER.—A small, much dichotomously-branched, glandular-pubescent annual, 4-5 in. high; stems slender, terete, erect. Leaves subulate, hardly acute, rigid. Peduncles slender, axillary; 1-flowered, $\frac{1}{3}$-$\frac{2}{3}$ in. long, diverging in fruit. Flowers, small $\frac{1}{8}$ in. long. Calyx, tubular-campanulate, with 5 green ribs, 5-toothed. Petals narrow, linear, retuse or bifid, longer than the calyx. Capsule, 5-valved at the tip, exserted. Seeds transversely rugose, with deep impressions.—*Handbook of New Zealand Flora, p. 22.*

DESCRIPTION, etc.—This herb is common to both Islands, in many places, and is found growing from sea level up to a height of 4,000 feet. It is not uncommon in South Australia. It is believed to be an importation; was originally described from Asia Minor, and is found nowhere but in that country, Australia, and New Zealand. Later observations are tending to prove, owing to the rapid increase of the plants in various parts of New Zealand, that it is an introduction.

GENUS II.

STELLARIA (*Linn.*) The Star-worts.

Generic Character.—Erect, or decumbent herbs, annual (or perennial) with flat or acerose leaves, and axillary or fascicled white flowers. Sepals 5, spreading. Petals 5, bifid or 0. Stamens 10 or fewer, hypogynous, or seated on an annular disk. Styles 3; ovules few or many. Capsule globose oblong, or ovoid, splitting into 3 bifid or 6 valves. Seeds often muricate.—*Handbook of New Zealand Flora, p. 22.*

Description, etc.—A very large genus in the temperate and cold regions of both hemispheres generally. Several species are indigenous to Great Britain. *Stellaria holostea*, the "Greater Stichwort,"—called also "Satin Flower" and "Adder's Meat,"—is one of the early British hedge flowers, with long, straggling, quadrangular, stems; narrow, grass-like leaves, and large, panicled, lustrous white flowers, with deeply-cloven petals. *Stellaria media* the Common Chickweed, is sufficiently marked, by a line of hairs on one side of the stem, changing to the opposite side, whenever it reaches a pair of leaves. The genus is represented in New Zealand by the following:—(1.) S. PARVIFLORA, a creeping herb; (2.) S. ELATINOIDES, a minute, creeping or ascending herb; (3.) S. DECIPIENS, a decumbent herb; (4.) S. ROUGHII, an erect herb; (5.) S. GRACILENTA, an erect, rigid herb.

1. STELLARIA PARVIFLORA (*Banks & Sol.*) The Small-flowered Stellaria.

Specific Character.—A very slender pale-green flaccid herb with prostrate, wiry, creeping stems and branches, a span long, and upwards, wholly glabrous, except a few hairs on the petioles. Leaves $\frac{1}{4}$–$\frac{1}{2}$ in. long, nearly orbicular, acute, rarely cordate at the base, longer than the petioles. Peduncles axillary, shorter than the leaves, 1–2 flowered, 2 bracteolate about the middle. Flowers minute, $\frac{1}{12}$ in. diameter. Sepals 5. Petals 0 or 5, shorter than the petals. Stamens 5 or 10. Capsule as long or longer than the sepals, 6-valved to the middle. Seeds about 8, pale brown, deeply pitted and reticulated.—*Handbook of New Zealand Flora, p. 23.*

Description, etc.—This species is common to both the Northern and Middle Islands; it is not uncommon in woods, and was originally found by the botanists Banks and Solander, on their first visit to New Zealand. In the Nelson district, it ascends the mountains to a height of 5,000 feet. It is allied to the Tasmanian *S. flaccida.*

OTHER SPECIES OF STELLARIA.

2. S. ELATINOIDES (*Hook., F.*)

A very small, glabrous, tufted, pale-green herb. Stems, $\frac{1}{2}$–1 in. long, erect or creeping, very slender or rather stout. Leaves $\frac{1}{12}-\frac{1}{5}$ in. long, and flowers $\frac{1}{10}$ in. diam. It is indigenous to the Northern Island only, and has been found on grassy banks of the East Coast, Hawke Bay, and a part of the Lake District.

3. S. DECIPIENS (*Hook., F.*)

A glabrous, laxly-tufted, weak, decumbent, pale-green, branching herb. Leaves, $\frac{1}{4}$–$\frac{1}{2}$ in. long, ovate or obovate, acuminate, narrowed into a broad, somewhat ciliate petiole. Peduncles, axillary, 1–3-flowered, 2 bracteolate in the middle, shorter or longer than the leaves. It is found in the islands forming the Lord Auckland Group, and in Campbell Island. It is closely allied to the *S. media* of Europe, which is naturalized abundantly in some parts of New Zealand, but differing in the axillary, 1-flowered peduncles, and absence of a pubescent line on the branches. Also allied to the Tasmanian *S. flaccida*, but the flowers are much smaller.

4. S. ROUGHII (*Hook., F.*) Captain Rough's Stellaria.

Fig. 5, Plate No. 6.—A short, much-branched succulent, erect or straggling, green Alpine herb, 2–4 in. high. Leaves, $\frac{1}{2}$–$\frac{2}{3}$ in. long, fleshy, linear, acuminate, 1-nerved. Flowers large, $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., terminal, solitary, on short stout peduncles. It is a very singular species, and easily recognised by its large green flowers, quite unlike any other in habit. It is indigenous to the Middle Island, being found on the mountains, in shingle beds, at an altitude of from 4,000 to 6,000 feet. Named by Sir J. D. Hooker, in honour of Captain Rough, one of our early and diligent botanists.

5. S. GRACILENTA (*Hook., F.*) The Slender Stellaria.

Fig. 6, Plate No. 6.—A wiry, rigid, loosely-tufted mountain species, with scabrid stems 2–4 in. high, and very long peduncles. Leaves, $\frac{1}{4}$ in. long, glabrous, shining; the margins revolute to the midrib, leaving a deep furrow between them. Peduncles axillary in the upper leaves, solitary, 1-flowered, 1–4 in. long. Flower $\frac{1}{3}$ in. diameter. Sepals linear, oblong, obtuse, with white, very broad, scarious margins. Petals, 5. Seeds, 8–10, yellow-brown. Found on the mountains of the Middle Island up to an altitude of 4,500 feet. It is a very peculiar species, and is at once recognized by its rigid, wiry habit, narrow leaves, and very long, erect, slender peduncles.

GENUS III.

COLOBANTHUS. (*Bartl.*) The Colobanthus.

Generic Character.—Usually densely tufted, rigid green herbs, with subulate, opposite leaves, and solitary green flowers on short or long terminal scapes or peduncles. Sepals 4 or 5, coriaceous, erect. Petals 0. Stamens 4 or 5, perigynous, alternate with the sepals. Styles, 4 or 5, opposite the sepals. Capsule ovoid, many-seeded.—*Handbook of New Zealand Flora, p. 24.*

Description, etc.—A remarkable genus of little rigid, tufted herbs, glabrous, and often fleshy, with narrow (or short) and imbricate leaves, and solitary green flowers.

It is a southern genus; found only in Australia, New Zealand, the Andes of South America, and the Antarctic regions. It consists of ten species, five of which are indigenous to New Zealand. Most of them are found in hilly, or alpine districts, and some have a remarkably moss-like appearance.

1. COLOBANTHUS QUITENSIS (*Bartl.*) The Quito Colobanthus.

SPECIFIC CHARACTER.—A small, glabrous, perennial, much-branched, tufted green herb, 1–2 in. high. Leaves chiefly radical $\frac{1}{4}$–$\frac{3}{8}$ in. long, subulate, acute, but not acicular (or rarely so) at the tips, concave above, convex on the back, quite entire. Scapes longer or shorter than the leaves, usually very short. Flowers 4-merous, $\frac{1}{8}$ in. long. Sepals ovate, blunt, rarely acicular at the tip. *Handbook of New Zealand Flora, p. 24.*

DESCRIPTION, etc.—This herb is found on the mountains of Nelson, and in the clefts of rocks on the Kowai River, at an altitude of 1,500 feet. Except in the rather smaller leaves, Dr. Hooker says that he can find no distinction between this and the South American variety, which is found along the Andes from Mexico to Cape Horn, and also in Amsterdam Island in the South Indian Ocean.

OTHER SPECIES OF COLOBANTHUS.

2. C. BILLARDIERI (*Fenzl.*)

A small, quite glabrous, often tufted, alpine herb, with small leaves like *C. quitensis*, but with acicular tips. Peduncles often 2 in. long. Flowers $\frac{1}{8}$–$\frac{1}{4}$ in. long, green, usually 5-merous. It is common throughout the Islands in alpine and hilly districts, and is abundant in Victoria and Tasmania.

3. C. SUBULATUS (*Hook., F.*)

A small, moss-like, densely-cæspitose, perfectly glabrous, plant, with subulate, rigid, shining leaves, forming tufts about 1 in. high. Flowers hidden amongst the leaves. Sepals, 4 or 5. It is indigenous to the Middle Island, in the Lake District, Sinclair Range and the Awatere Valley. It is likewise found in the Alps of Victoria, and abundantly in Antarctic America.

4. C. ACICULARIS (*Hook., F.*) The Needle-pointed Leaved Colobanthus.

Fig. 7, Plate No. 6.—A small, moss-like, densely-cæspitose, shining, rigid, glabrous, alpine plant, forming tufts 1–2 in. high. Flowers sessile, shorter than the leaves. Sepals, 5. Found in dry, rocky places—Wairau Gorge and Otago Lake District; abundant.

5 .C. MUSCOIDES (*Hook., F.*)

A perfectly glabrous, moss-like, densely-tufted, bright-green plant; soft, and rather flaccid in texture, forming large patches. Flowers minute, sunk amongst the leaves. Found in the Lord Auckland Group, and Campbell Island, on rocks near the sea.

GENUS IV.

SPERGULARIA. (*Pers.*) The Sand Spurrey.

Generic Character. — Spreading dichotomously-branched, perennial herbs, with linear leaves, scarious stipules, and white or rose-coloured peduncled flowers. Sepals 5, spreading. Petals 5, obtuse, or 0. Stamens 5 or 10, hypogynous. Ovary subglobose. Styles 3. Capsule 3-valved. Seeds compressed, often winged.—*Handbook of New Zealand Flora, p. 25.*

Description, etc.—This is a small British genus, of which species are scattere over many temperate and warm parts of the globe, especially near the sea, and in waste places. The genus consists of small weedy herbs, with opposite or fasciculate-whorled, setaceous, or more or less cylindrical, fleshy leaves, and lilac or pink flowers.

1. SPERGULARIA RUBRA (*Pers.*) var. *Marina*. The Pink-flowered Spergularia.

Specific Character.—A rather succulent, excessively-branched, prostrate or sub-erect annual herb, with perennial root, more or less pubescent, with viscid down. Stems and branches terete, 1 in. to a span long. Leaves linear, ⅓–1 in. long, quite entire. Flowers numerous, axillary and terminal, on long slender peduncles, ½–1 in. long, which are often patent, or reflexed. Flowers very variable in size, ¼–⅓ in. long. Sepals green, with a white membranous border. Petals shorter than the sepals, sessile, often very pale. Stamens 5. Seeds with a broad membranous wing.—*Handbook of New Zealand Flora, p. 26.*

Description, etc., Fig. 8, Plate No. 6.—This herb is common on the sea shore in places throughout the Islands. It is also found under various forms in all temperate and many tropical localities. The field weed, *Spergula arvensis*, or Corn Spurrey, which is closely allied to this herb, is very common in Britain. According to Don, the botanist, this plant is grown on the Continent of Europe to serve as pasture for cattle, as it imparts a fine flavour to mutton, and enriches the milk of cows. Another ally, *S. pilifera*, has, of late years, been grown in English gardens as a substitute for grass on lawns. Its foliage is of a pleasant green colour, and delicate texture; it soon establishes itself, and possesses the recommendation of retaining its verdure in the dryest and hottest seasons. The latter advantage it owes to the fact that it belongs to a class of plants which evaporate their moisture slowly, whilst its long fibrous roots descend to a sufficient depth to be little affected by drought. The New Zealand species, *S. rubra*, is a very handsome little plant, with large pink or white flowers, and linear leaves. It delights in the sandy shores and waste places of the coast line throughout both Islands.

CHAPTER VII.

ORDER VII.—PORTULACEÆ. The Purslane Family.

CHARACTER OF THE ORDER.—Herbs, usually glabrous, often succulent, with opposite (rarely alternate) exstipulate (rarely stipulate) leaves, and hermaphrodite flowers. Sepals 2 or 3 imbricate. Petals 4 or 5, free or connate to the base, hypogynous, imbricated. Stamens 5 or fewer, often adnate to the base of the petals. Ovary 1-celled. Style more or less deeply 2–3-fid, the arms stigmatose on the inner face. Ovules several or many, in the base of the cell. Capsule membranous, with as many valves as styles, and one or many seeds. Seeds with a crustaceous testa, farinaceous albumen, and terete curved embryo.—*Handbook of New Zealand Flora, p. 26.*

DESCRIPTION OF THE ORDER.—

FOUND in various parts of the World; chiefly, however, in South America, and at the Cape of Good Hope. The plants always inhabit dry places, and have a great affinity to *Caryophylleæ.* The New Zealand genera are:—(1), **CLAYTONIA**, leaves opposite or in pairs; stamens 5; (2), **MONTIA**, leaves opposite, stamens 3–5 opposite the petals; (3), **HECTORELLA**, leaves densely imbricate, stamens 5, alternate with the petals. The name of the Order signifies "to carry milk," from some of the plants in it having milky juice.

GENUS I.

CLAYTONIA (*Linn.*) The Claytonia.

GENERIC CHARACTER.—Herbs with opposite alternate, or fasciculate leaves, and racemose or solitary flowers. Sepals 2, herbaceous. Petals 5, united at the very base, or free. Stamens 5, adnate to, and opposite to the petals. Ovary many-ovuled. Capsule 3-valved, 3 or more seeded. *Handbook of New Zealand Flora p. 27.*

DESCRIPTION, etc.—A large North American genus, of which the only representative found in the Eastern Hemisphere, is *C. australasica,* described below. The genus was named in honour of Dr. John Clayton, a botanist of repute, who collected the plants for the "Flora Virginica" of Gronovius. Several species have been introduced into British gardens from North America, and are plants of very elegant growth.

1. CLAYTONIA AUSTRALASICA (*Hook., F.*) The Australian Claytonia.

Specific Character.—A glabrous, slender, creeping, rather succulent tender herb, extremely variable in size. Leaves solitary or in distant pairs, narrow-linear, or linear-spathulate, ½–2 in. long, quite entire, pale green, obtuse, nerveless, the petioles dilating into membranous stipules at the base. Scapes axillary, solitary, 1-flowered, erect, usually shorter than the leaves. Flowers pure white, very variable in size, ¼–⅔ in. diameter. *Handbook of New Zealand Flora, p. 27.*

Description, etc., Fig. 9, Plate No. 6.—This beautiful little slender herb is indigenous to the Middle Island; it is found in boggy places, and ascends the Southern Alps to a height of 5,000 feet. In proportion to the size of the plant, the flowers may be considered large and handsome. Of the order, this genus is the only one which contains ornamental perennial plants. Many of these are in cultivation in Britain, having been introduced from North America in the year 1768.

GENUS II.

MONTIA (*Linn.*) The Montia.

Generic Character.—A small annual, branched or simple, usually tufted, glabrous herb, with opposite rather fleshy, spathulate leaves, and small white, axillary, peduncled flowers. Sepals 2, (rarely 3.) Petals 5, connate at the base. Stamens usually 3 or 5, opposite the petals, and adnate to them. Ovary and capsule as in *Claytonia*, but only 1–3 seeded.—*Handbook of New Zealand Flora, p. 27.*

Description, etc.—A British genus found in many parts of the North and South temperate zone. *M. fontana*, or "Water Chickweed," is a common minute aquatic, growing on the banks of streams, and has, like many other aquatic plants, a wide geographical range.

1. MONTIA FONTANA (*Linn.*) The Water Chickweed, or Water Blink.

Specific Character.—A glabrous, slender, branching, weak, bright green marsh or water plant, very variable in size. Stems 1–12 in. high. Leaves ¼–1 in. long, from elliptical-ovate to linear-lanceolate, sub-acute, quite entire. Flowers about ⅛ in. broad.—*Handbook of New Zealand Flora, p. 27.*

Description, etc.—This minute aquatic is common in watery places throughout the alpine parts of the Northern and the Middle Islands, and in Campbell Island; it is also found in Tasmania, Kerguelen Land, and throughout temperate North and South America, and Europe.

GENUS III.

HECTORELLA (*Hook. F.*) The Hectorella.

Generic Character.—A small densely tufted, glabrous, moss-like plant. Leaves most densely imbricated all round the stem, coriaceous, entire. Flowers almost sessile, amongst the uppermost leaves, white. Sepals 2, short, concave, truncate, continuous with the very short, broad, flat pedicel. Petals 5, united at the very base, erect, veined, obtuse, thickened below the tip. Stamens 5, inserted on the tube of the coralla, alternate with the petals; filaments as long as the petals; anthers linear-oblong, 2-celled. Ovary ovoid, membranous, veined, narrowed into an erect style; stigmas 1–3, linear, thickened, papillose internally. Ovules 4–5, erect from the base of the cell, amphitropous, funicle, slender. Fruit unknown.—*Handbook of New Zealand Flora, p. 27.*

Description, etc.—A remarkable genus, allied to no other, but approaching in habit to *Lyallia* of Kerguelen Land. The genus is named in compliment to Sir James Hector, F.G.S., during whose adventurous expedition to the Otago Alps it was discovered.

1. HECTORELLA CŒSPITOSA (*Hook., F.*) The Tufted Hectorella.

Specific Character.—Stems 1–1¼ in. high, most densely tufted, and with the leaves on them nearly as thick as the finger. Leaves excessively numerous and closely imbricate, spreading, broadly triangular-ovate, ⅙ in long, much dilated and membranous below the middle, coriaceous above, with thickened margins and keel, veins reticulated. Flowers several, from amongst the leaves at the tips of the stems, nearly ¼ in. long, white.—*Handbook of New Zealand Flora, p. 27.*

Description, etc., Fig. 10, Plate No. 6.—This beautiful and curious alpine is found abundantly on Mount Alta, in the Middle Island, where it may be seen in patches on steep, rocky places at an altitude of 5,000 feet. It was first discovered by Sir James Hector, F.G.S., in 1862, during his visit to the Otago Alps, in pursuit of alpine plants, and in the cause of science generally. A marked feature in this truly beautiful plant is the arrangement of the flowers, which are pure white, in circles at the ends of the branches; many of these class of plants, which are known as "Patch Plants," having only one terminal flower on each branch. The artist, in depicting this alpine gem, has happily given life to the subject, and clearly shews this distinctive feature.

CHAPTER VIII.

ORDER VIII.—ELATINEÆ. The Water Peppers, or Water-worts.

CHARACTER OF THE ORDER.—Small water plants, rarely shrubs, mostly prostrate, with usually opposite stipulate leaves. Flowers small or minute, hemaphrodite, regular. Sepals 2–5, free, imbricate. Petals 2–5, free, hypogynous, imbricate. Disk 0. Stamens as many as the petals, or twice as many, hypogynous, free. Ovary free, 2–5 celled; Styles 2–5, stigmas capitate; Ovules numerous in the angles of the cells. Capsule septicidal, the valves falling away and leaving the seeds attached to a central column. Seeds straight or curved, with terete embryo and no albumen.—*Handbook of New Zealand Flora, p.* 28.

DESCRIPTION OF THE ORDER.—

DISTRIBUTED generally over the world, though a small order. Some of the plants possess acridity, hence their English name of "Water Peppers." There are six known genera and twenty-four species. New Zealand is represented by only one genus, that of *Elatine.*

GENUS I.

ELATINE (*Linn.*) The Water-worts.

GENERIC CHARACTER.—Aquatic, creeping, glabrous, small herbs, with pellucid dotted leaves, and minute, axillary, solitary flowers. Sepals membranous, obtuse; Ovary globose. Capsule membranous, the septa either disappearing, or persistent on the axis. Seeds oblong or cylindrical, longitudinally striated and transversely wrinkled.—*Handbook of New Zealand Flora, p.* 28.

DESCRIPTION, etc.—A genus of dwarf annual aquatics, with rooting pipe-like stems, and opposite leaves. There are two British species, called Water-worts, both of unusual occurence. *E. hexandra* is a minute plant scarcely an inch high, which grows on the margins of lakes, where it forms a moss-like mat, sometimes extending under the water, and in dry seasons, when it is left by the receding water, assuming a crimson hue. The flowers, which are minute and flesh-coloured, grow in the axils of the opposite leaves. *E. hydropiper*, the Water Pepper, scarcely differs from the preceding, except that the flowers are octandrous. They might be sown with advantage on the shelving banks of artificial water, to conceal the unsightliness of mud.

1. ELATINE AMERICANA (*Arnott.*) The American Water-wort.

Specific Character.—A minute, glabrous, prostrate, matted aquatic. Stem rather succulent, creeping, sometimes elongated, and 1–8 in. long. Leaves small, $\frac{1}{8}$–$\frac{1}{2}$ in. long, obovate-oblong, obtuse, quite entire, shortly petioled. Flowers minute, sessile, 3-merous. Calyx persistent. Capsule with the septa disappearing. Seeds slightly curved.—*Handbook of New Zealand Flora, p. 28.*

Description, etc.—This minute aquatic is probably common in bogs in the Northern Island. It is also found in Tasmania, Australia, the Fijis, and North and South America. Equally with the European species, it would be found of use in clothing the margins of artificial water to hide unsightly approaches.

CHAPTER IX.

ORDER IX.—HYPERICINEÆ. St John's Worts.

CHARACTER OF THE ORDER.—Herbs, shrubs or trees, with opposite, simple, quite entire or glandular-toothed, often pellucid-dotted exstipulate leaves. Flowers regular, hermaphodite. Sepals 5, imbricate. Petals 5, hypogynous, imbricate. Disk 0. Stamens indefinite, hypogynous, free or polyadelphous, filaments filiform. Ovary 3–5 celled, or 1-celled with inflexed margins to the carpels. Styles as many as carpels, filiform, free or connate, stigmas terminal; Ovules numerous, in 2 series in the axis of the cells, or on the inflexed edges of the carpels. Fruit usually capsular. Seeds exalbuminous.—*Handbook of New Zealand Flora, p. 28.*

DESCRIPTION OF THE ORDER.—

EXTENSIVELY distributed throughout the world. There are nineteen genera, and nearly three hundred species in the order. Some of the plants are purgative, others tonic and astringent, and some species yield a gum resin similar to gamboge. The name *Hypericum* is as old as the time of Dioscorides, but its origin and meaning are uncertain. Some derive it from the Greek word *huper*, under, and *eikow*, an image; and suppose it to signify that the upper part of the flower represents a figure. Others state that *hyper* signifies through, and that the name alludes to the pellucid dots in the leaves, which form small lenses, through which, when held to the light, images may be seen. The French name of the plant, *Millepertuis*, "a thousand pores," is evidently derived from the same source. The English name, "St. John's Wort," is taken from the country people formerly being in the habit of gathering this plant on St. John's Day, to use it to protect themselves from the influence and attacks of evil spirits.

GENUS I.

HYPERICUM (*Linn.*) The St. John's Herb.

Generic Character.—Sepals and petals 5. Stamens very numerous, all free, or connected into bundles. Ovary 1 or 3–5 celled. Capsule septicidal. Seeds not winged, with a straight embryo.—*Handbook of New Zealand Flora, p.* 28.

Description, etc.—An extensive genus of herbaceous, or shrubby plants giving the name to the order. The best known example is *H. calycinum*, a somewhat shrubby European plant one to two feet high, with large almost evergreen leaves, curiously sprinkled with pellucid dots. The flowers are very large, terminal and solitary. *H. androsæmum*, (by some authors made a distinct genus on account of its berry like capsules) is, in the West of England, a common hedge, or woodland plant, growing to the height of one and a-half feet. The New Zealand species are: H. GRAMINEUM, an erect herb with subcordate leaves; and H. JAPONICUM, a much smaller plant, procumbent, with oblong or obovate leaves.

1. HYPERICUM GRAMINEUM (*Forst.*) The Grass or Field Hypericum.

Specific Character.—An erect or ascending, rather wiry, quite glabrous, perennial-rooted herb, branching from the root, with 4-angled branches 6–12 inches high, slender and sparingly leafy. Leaves small, ½–1 in. long, sessile, cordate, oblong, obtuse, quite entire, black dotted, margins usually revolute. Flowers subsolitary or in 3-chotomous terminal cymes, ¼–½ in. across, on rather stout, erect, rigid peduncles. Sepals oblong or ovate, obtuse or acute, black dotted, quite entire. Petals longer than the calyx, golden-yellow, curling inwards as they wither. Stamens nearly free. Capsule ovoid, acute, longer or shorter than the sepals.—*Handbook of New Zealand Flora, p.* 29.

Description, etc.—This species is common in grassy places throughout New Zealand, and is also frequent in temperate Australia, New Caledonia, and the hilly country of India. The leaves of some of the British species were formerly applied to fresh wounds, which they were supposed to heal; hence the plant was called in French *Toutesaine*—corrupted into Tutsan, its common English name. The pellucid dots, and black glands in all the species contain an essential oil.

2. HYPERICUM JAPONICUM (*Thunb.*) The Japan Hypericum.

Specific Character.—A much smaller plant than *H. gramineum*, with prostrate branches, broader, flat leaves, smaller, often sessile flowers, having broader, more obtuse sepals, and shorter, rounder capsules.—*Handbook of New Zealand Flora, p.* 29.

Description, etc.—Abundant in most grassy places throughout New Zealand. It is also found in many parts of temperate and sub-tropical Asia. A very similar and perhaps identical plant inhabits the West coasts of temperate North and South America. Intermediate forms, says Dr. Hooker, are found in New Zealand, Australia, and India, in all of which countries both occur; and he suspects that they are the extreme forms of one variable species.

CHAPTER X.

ORDER X.—MALVACEÆ. The Mallow Family.

CHARACTER OF THE ORDER.—Herbs, shrubs or trees, with (usually) tough fibrous inner bark, alternate stipulate, leaves, and stellate hairs. Flowers usually hermaphrodite, regular and large. Calyx, 5-lobed, lobes valvate. Petals 5, hypogynous, usually connate at the base, adnate to the staminal tube, imbricate. Disk 0, or a small torus. Stamens very numerous, their filaments united into a tube. Anthers often reniform, 1-celled. Ovary of 1 or more, free or connate, 1 or many-ovuled carpels, whorled round, and adnate with the torus. Styles as many as carpels, connate below, filiform above. Fruit of one or more indehiscent or 2-valved cocci, or capsular. Seeds, often hairy. Albumen, little or none. Cotyledons large, folded.—*Handbook of New Zealand Flora*, *p.* 29.

DESCRIPTION OF THE ORDER.—

THIS large order is abundant in the Tropics and temperate zones, to which the Mallow, Lavatera, Hollyhock, Cotton, and many other well-known cultivated New Zealand garden plants belong. There are nearly fifty genera in the order, and upwards of one thousand species; all of which are mucilaginous, demulcent, and fibre-yielding. *Althæa officinalis* (Marsh Mallow) yields mucilage; *Gossypium* furnishes various kinds of cotton. This genus is one of the most important in the whole vegetable kingdom; to it we are indebted for the valuable and well-known article, Cotton, which occupies such a prominent place in the manufacturing industry of nearly all civilised countries, and gives employment to so large a portion of the British mercantile marine. The Cotton of commerce consists of the hairs attached to the seeds of the plant; it is obtained more especially from *Gossypium herbaceum*, *G. barbadeuse*, *G. arboreum* and *G. peruvianum*. Cotton plants are cultivated in the United States of America, the East and West Indies, the Brazils, Egypt, and the South Sea Islands. The use of Cotton dates from pre-historic ages. It is frequently mentioned in ancient writings before the Christian era. Pliny mentions that it grew in "Upper Egypt on the side of Arabia, where robes were made of Cotton for the Egyptian priests." It was brought into Spain by the Mahomedan conquerors of that country, and so spread through Europe. *Hibiscus cannabrinus* supplies Indian hemp, and *Paratium elatium* gives "Cuba bast." *Malva moschata,* the Musk Mallow, derives its name from the peculiar musky odour given off by all parts of the plant when kept in a confined situation, particularly in warm dry weather; but this odour is seldom powerful enough to be smelt in the open air. The plant is a perennial, and has large rose-coloured flowers; it is found along hedges, roadsides, and borders of fields in Britain. *M. rotundifolia* is an annual, with tough downy stems lying along the ground, roundish lobed leaves, and small pale-blue flowers; it is common in waste places in most parts of Europe, including Britain, and in Western Asia. In Egypt, especially upon the banks of the Nile, it is extensively cultivated, and used by the natives as a pot-herb. *M. sylvestris,* the common Mallow, or "*Mauve*" of the French, is employed medicinally on account of its highly mucilaginous properties, a decoction of it being used outwardly as an application to bruises, and internally in dysentery. It is in great repute amongst herb doctors, and rustic practitioners generally, particularly in France, where its dried flowers are largely used in the preparation of a drink called "*Tisane,*" held to be a cure for headaches, feverish colds, and many other complaints; its leaves are also used for making poultices. It is a biennial, having erect, somewhat hairy stems, roundish long-stalked leaves, and reddish-purple flowers. The order receives its name from the mucilaginous properties of the plants contained in it. There are many very handsome species in cultivation in British gardens. The order is represented in New Zealand by the following genera:—(1.) PLAGIANTHUS, shrubs or small trees with very tough inner bark, and uni-sexual or bi-sexual flowers; (2.) HOHERIA, small trees with pellucid dotted foliage, and hermaphrodite flowers; (3.) HIBISCUS, erect herbs, with often lobed leaves, and hermaphrodite flowers.

GENUS I.

PLAGIANTHUS (*Forst.*) The Plagianthus.

'GENERIC CHARACTER.—Shrubs or small trees, with very tough inner bark. Flowers uni- or bi-sexual. Bracts 0, or small, and distant from the calyx. Calyx 5-toothed or 5-fid. Staminal tube divided above into many short, or long filaments. Ovary of 1 free, or many more or less united, 1-ovuled carpels. Styles filiform or club-shaped, combined below, stigmatiferous towards the apex along the inner face. Fruit of 1 indehiscent or irregularly bursting carpel, or of many whorled round an axis. Seed pendulous.—*Handbook of New Zealand Flora, p.* 30.

DESCRIPTION, etc.—A small genus confined to Australia, Tasmania and New Zealand. One species is a tall tree, and the others are large shrubs, or small trees. *P. sidoides* is one of several plants with fibrous bark, which, in Tasmania and New South Wales, bear the native name of "Kurrajong." The New Zealand species are:—P. DIVARICATUS, a much-branched shrub; P. BETULINUS, a lofty tree, or straggling bush; and P. LYALLII, a small tree.

1. PLAGIANTHUS DIVARICATUS (*Forst.*) The Branch-spreading Plagianthus.

SPECIFIC CHARACTER.—A rigid, glabrous, much-branched shrub, with slender, spreading, tough branches, small fascicled leaves, and minute white flowers, succeeded by small globose capsules. Leaves ⅓–¾ in. long, narrow linear, or sub-cuneate, obtuse, quite entire, 1-nerved. Flowers in axillary fascicles or 1-flowered peduncles, shorter than the leaves, minutely bracteolate near the base. Calyx hemispherical, glabrous. Petals concave, oblong, small. Staminal tube with 6–10 large sessile anthers. Capsules size of a peppercorn, globose, rarely didymous, oblique, downy, bursting irregularly. —*Handbook of New Zealand Flora, p.* 30.

DESCRIPTION, etc., Fig 1, Plate No. 11.—"THE BRANCH-SPREADING PLAGIANTHUS."—This hardy-looking shrub is abundant in salt marshes, and along the banks of tidal estuaries throughout the Islands, as far south as Canterbury. It is very compact in growth, and forms dense masses; its slender, tough branches spreading and interlacing so as to form an impenetrable scrub. It affords most excellent shelter, and should be useful to arrest the progress of sand dunes from spreading over adjacent country. The capsules, or seed receptacles, are white, about the size of a peppercorn, and arrive at maturity during the latter end of January, or beginning of February, when the bushes are, for the most part, densely covered with them. The average height of the plant is about four feet; its flowers are inconspicuous, but they possess a fragrance.

2. PLAGIANTHUS BETULINUS (*A. Cunn.*) The Birch-like Plagianthus.

SPECIFIC CHARACTER.—A lofty tree attaining 40–70 ft.; when young, a straggling bush with variable leaves. Leaves of young plants ¼–½ in. long, ovate-rounded, variously crenate and lobed, in full growth 1–2 in. long, ovate or ovate-lanceolate, acuminate, rounded, or cuneate at the base, coarsely crenate-serrate, or obtusely doubly serrate, membranous, covered on both surfaces with small stellate hairs, and reticulate venation; petiole slender. Panicles terminal, much-branched, very many-flowered, stellate-tomentose. Flowers small, ¼ in. broad, white, on slender ebracteolate pedicels. Calyx campanulate. Petals linear-oblong, narrower in the male flowers. Staminal tube long, slender, exserted in the male, bearing many shortly-pedicelled anthers. Carpel 1. Capsule small, ovoid, accuminate, splitting down one side, 1-seeded.—*Handbook of New Zealand Flora, p.* 30.

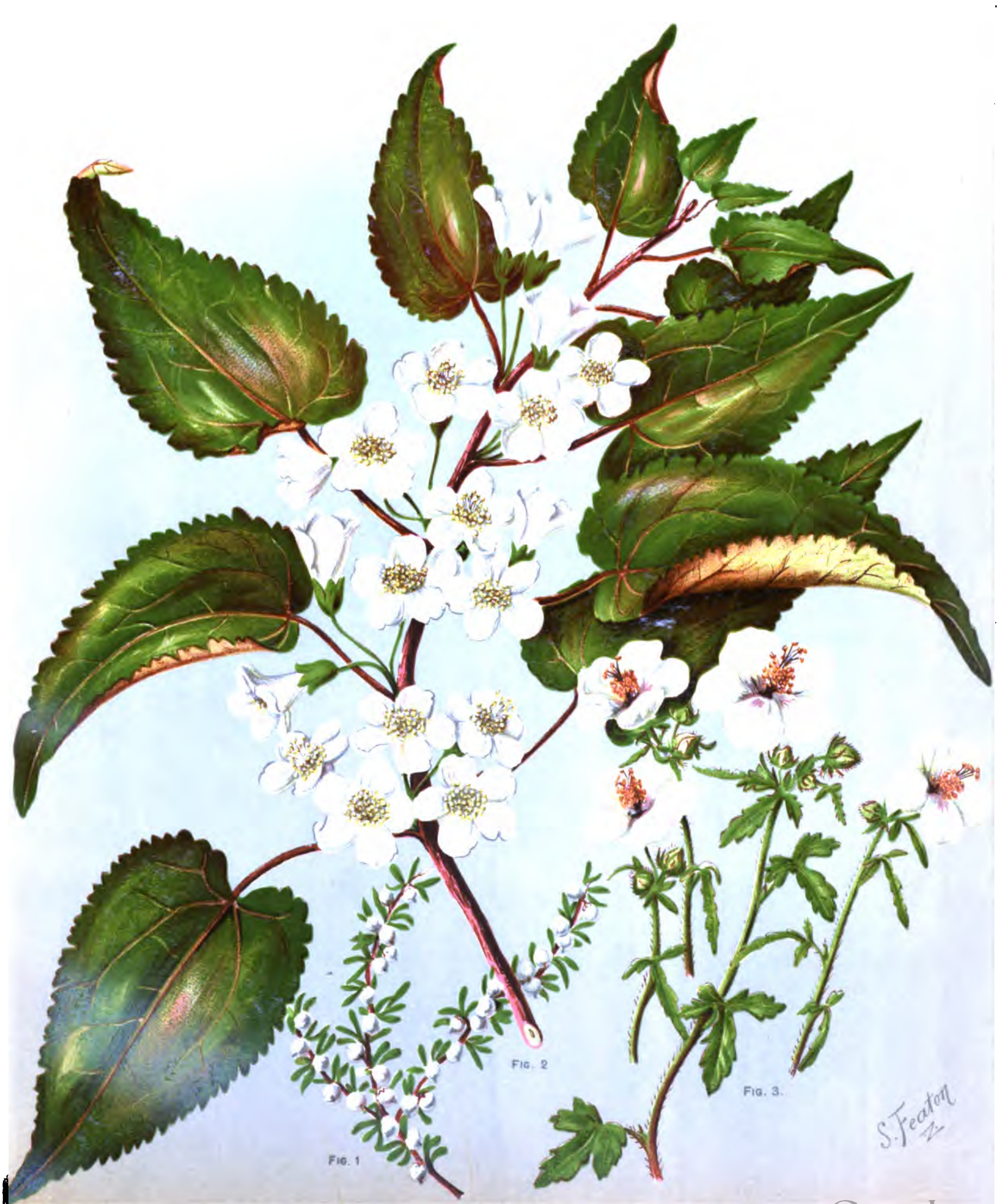
DESCRIPTION, etc.—This species, when a tree, often attains a height of fifty feet, with a trunk from 1–2½ ft. in diameter; but it is more often found as a straggling bush. It is abundant in forests in most districts throughout the Islands, reaching as far south as Otago, where it is generally known as the "Ribbon Tree," on account of the tough, fibrous, inner bark which it possesses. This species is very graceful in appearance, more closely resembling the European Birch than any other tree in the Colony. On this account, it has obtained its name of *Betulinus*. The wood is white, compact, fissile, but not durable. It has been used for shingles, but is not to be recommended. In some districts, it is extensively used as firewood. The inner bark of the young branches yields the toughest fibre, and has been used by the Maoris for cordage, and twine for fishing nets. The tree is known by the native name of "Houi," or "Whau-whi," and botanically once bore the nomenclature of *Phillipodendron regium*, in honour of Louis Phillipe, King of France, described by Poiteau, the French botanical draughtsman, in whose work, "*Annales des Sciences Naturelles*," there appears a drawing. This species blossoms in December, and bears a great number of small, white, sweet-scented flowers, containing honey.

3. PLAGIANTHUS LYALLII (*Hook.*, *F.*) Mr. Lyall's Plagianthus.

Specific Character.—A small branching tree, 20–30 ft. high, with the young branches, inflorescence, and leaves below, covered with white stellate down. Leaves 2–4 in. long, ovate-cordate, acuminate, deeply doubly crenate, glabrous above; petioles ½–1½ in. Flowers large, ¾ in. broad,. white, axillary; peduncles 1-flowered, solitary or fascicled, ebracteolate, about as long as the petioles. Calyx broadly campanulate. Petals obliquely obovate-cuneate, obscurely notched on one side towards the apex. Staminal tube short, with many long filiform filaments. Ovary about 10-celled, style slender, divided into as many filiform branches, stigmatose on the inner surface towards the apex. Fruit a depressed sphere, breaking up into 10 compressed reniform membranous carpels. Seed much compressed.—*Handbook of New Zealand Flora*, *p.* 30.

Description, etc., Fig. 2, Plate No. 11.—"THE HOHERE."—This very handsome tree is found in the mountainous districts of the Middle Island, from Nelson to Milford Sound, fringing the *Fagus* forests on the western slopes of the dividing ranges. Sir Julius Von Haast states that it is deciduous at and above 3,000 feet, but is evergreen below that level. In Autumn, its naked branches and yellow foliage give a peculiar colour to the landscape, at the higher elevation. Owing to the flowering habit of the tree, and its fruit being a depressed sphere, hanging on a long peduncle or stalk, it is commonly known by the settlers as the "Wild Cherry." The wood is white, but possesses no durability. It was formerly in demand for fencing purposes and shingles, but experience has proved its unsuitability; it is only used as firewood. This tree is very beautiful when seen in its native habitat. It blossoms in the months of February and March, when it is laden with masses of delicate white flowers, each flower being three-quarters of an inch across, and forms a conspicuous and charming adjunct to the mountain scenery. It is scarcely possible to conceive any sight more picturesque and pleasing, than the dark background of a mountain ravine enlivened by a fringe of the beautiful Hohere, in full blossom, following the windings of a mountain stream. On account of the fibrous nature of its inner bark, it is popularly known in the Middle Island as one of the "Ribbon Wood" or "Lace Bark" trees, as is the *Hoheria populnea*, and its varieties, in the Northern Island. It bears its specific name in honour of Mr. Lyall, a New Zealand botanist of repute.

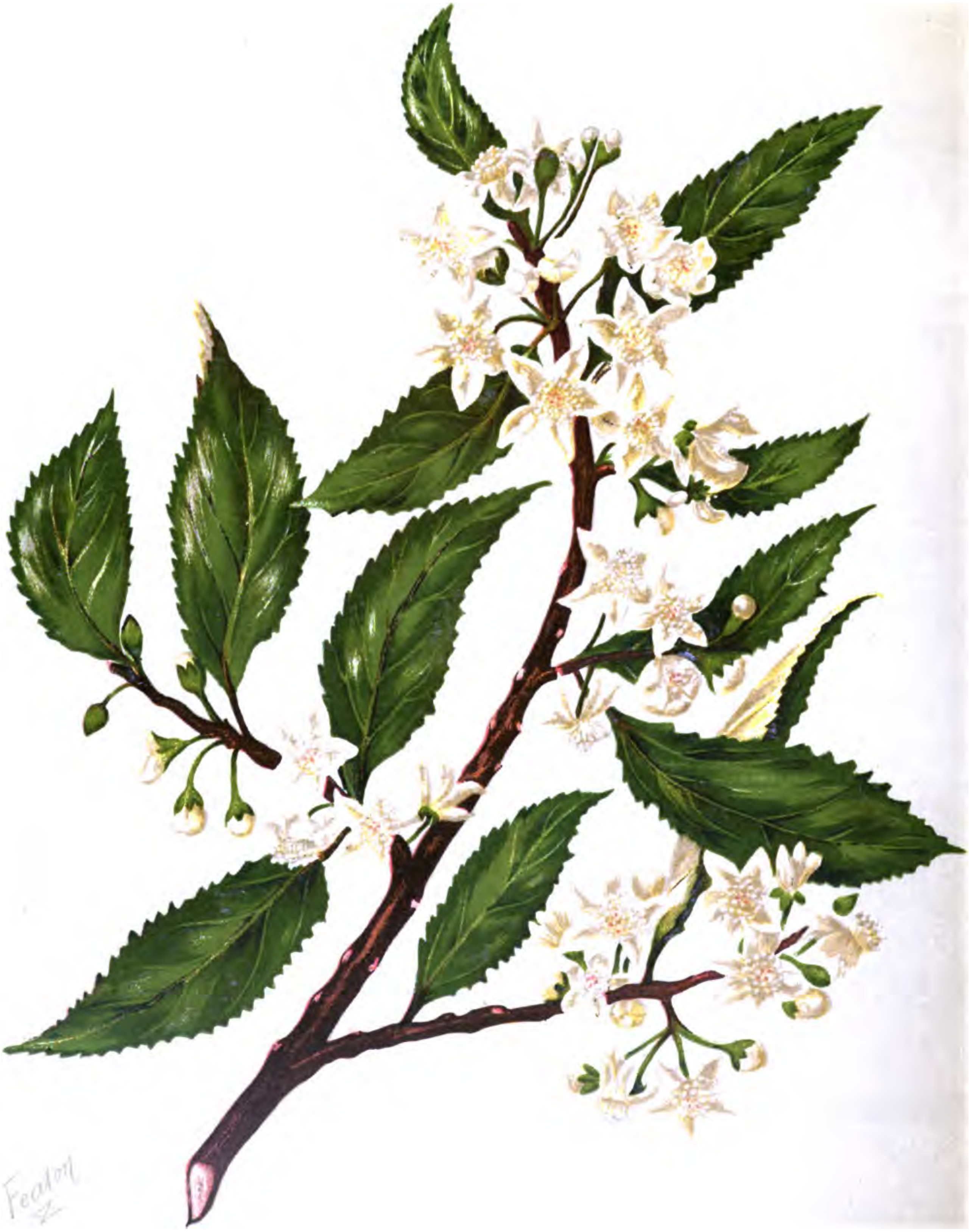
PLATE No. 11.



COPYRIGHT.

BOCK & COUSINS, CHROMO-LITH

Fig. 1.—PLAGIANTHUS DIVARICATUS. Fig. 2.—PLAGIANTHUS LYALLII. Fig. 3.—HIBISCUS TRIONUM.



CHROMO-LITHO

HOUI.—Hoheria populnea.

olden times it was employed by the Maoris for fabrication into the "tapa" cloth worn by their chiefs. The "Houi" has several varieties, the most common ones being var. *A. vulgaris,* with ovate leaves, possessing large sharp teeth; var. *B. lanceolata,* leaves linear or oblong-lanceolate, toothed or serrate; var. *C. angustifolia,* leaves small, linear oblong, spinulose-toothed, flowers small; and var. *D. cratægifolia,* the handsomest of them, leaves ovate, variously lobed, and toothed. All of these have fibrous bark, and white flowers. Our plate is remarkable for its fidelity, and portrays vividly the appearance of this beautiful *Hoheria.*

2. HOHERIA SINCLAIRII (*Hook., F.*) Dr. Sinclair's Hoheria.

Specific Character. — Larger in all its parts than *H. populnea,* and readily distinguished from it by its broadly ovate, acute, obtusely serrate, coriaceous, glabrous leaves. The peduncles are usually binate, and shorter than the petioles. It much resembles *Plagianthus Lyallii,* but the leaves are not cordate, more serrate, the peduncles jointed in the middle, stigmas capitate and carpels 5.—*Handbook of New Zealand Flora, p.* 31.

Description, etc.—This beautiful tree is said to be indigenous only to the Northern Island; and, as little is said of it by Dr. Hooker in his remarks, it is, without doubt, rather scarce. The specimen which the Editor of the "*Handbook*" received for classification was amongst some Auckland plants sent, without localities, by Dr. Sinclair. It may possibly be found in other districts in the Northern island, but no definite information has been received on the subject. As it much resembles *Plagianthus Lyallii,* it follows that it must be a very handsome tree. This species is named in honour of the late Dr. Sinclair, R.N., F.L.S., the contributor, formerly Colonial Secretary, an enthusiastic botanist, and a man of high and varied attainments, who was unfortunately drowned in the Rangitata River, whilst on a botanical exploration of the Southern Alps, in company with Sir Julius Von Haast.

GENUS III.

HIBISCUS (*Linn.*) The Hibiscus.

Generic Character—Usually erect herbs, with often lobed leaves and handsome hermaphrodite flowers. Bracts numerous (or few) below the calyx, free or connate. Calyx 5-fid or 5-toothed. Petals usually cuneate, oblique, soon withering. Staminal tube long, 5-toothed at the mouth, below which the filaments are inserted. Ovary 5-celled, with 5 spreading styles and terminal stigmas; cells 2-ovuled. Capsule 5-valved, loculicidal. Seeds glabrous, or woolly.—*Handbook of New Zealand Flora, p. 31.*

Description, etc.—A very large tropical genus, containing many handsome plants, characterised by their large showy flowers, borne singly upon stalks towards the ends of the branches. The majority of the species are tropical, but a few are found in temperate regions; and one, *H. trionum,* occurs in the South of Europe, Australia, and New Zealand. Most of the species are shrubby, but a few form moderately high

F.L.S. It was at one time supposed, by Mr. Allan Cunningham, the Australian botanist, to have been introduced into New Zealand; but Mr. Colenso, F.L.S., whose long and large botanical experience in the Colony stands unquestioned, affirms that the plant is certainly indigenous. At the present time, it is exceedingly rare, and only to be met with in few and retired places. The inroads of civilisation, with its attendant *improvements*, assisted by fire and cattle, may be said to have practically annihilated one of the prettiest and most ornate specimens of New Zealand plants. This species is likewise indigenous to Australia, where it is much prized, and kept under cultivation as a garden flower. It is propagated by seed, as are all the single-flowered varieties, which come up true to their respective colours. The New Zealand plant has pale primrose-coloured flowers, with a purple patch at the bottom of each lobe, a purple staminal tube, and orange-coloured anthers. It is stated in some districts, that the flowers are devoid of the purple colouring. Our plate representing "The New Zealand Hibiscus," is taken from a plant raised in the vicinity of Pouawa, East Coast; and we trust that our endeavours to perpetuate the memory of so beautiful a plant will be acceptable to our readers. The specific name of *Trionum*, accorded this species, is somewhat vague, but it may possibly bear allusion to the Constellation "Triones," the seven stars of the Greater Bear; but the reason is not altogether clear, nor the connection apparent.

The white, soft, but close-grained wood is used by carvers and turners, and by musical instrument makers, for sounding boards. The tough inner bark, called *Bast*, is the material of which the Russian mats used by gardeners and upholsterers are made; and the Russian peasants make shoes, ropes, nets, and other articles of it. The sap yields sugar, and the flowers an abundance of honey, of which the bees are exceedingly fond. The order in New Zealand is represented by three genera, viz.:—(1.) **Entelea**, a small branching tree, leaves alternate; (2.) **Aristotelia**, shrubs or trees, leaves opposite; (3.) **Elœocarpus**, trees generally hard-wooded, leaves alternate.

GENUS I.

ENTELEA (*Brown.*) The Entelea.

Generic Character.—A small, branching, light-wooded tree, covered with stellate down, having large, alternate, 5–7-nerved, cordate, toothed, stipulate leaves, and umbellate cymes of white flowers. Sepals, 4 or 5, free. Petals, 4 or 5, undulate. Stamens very numerous, free, on a low torus, with filiform filaments, and versatile anthers. Ovary 4–6-celled; style simple, stigmatiferous at the toothed apex; cells, many-ovuled. Capsule globose, echinate, with long rigid bristles, 4–6-valved, loculicidal.—*Handbook of New Zealand Flora, p.* 32.

Description, etc.—This genus is peculiar to New Zealand, and is represented by a single species, *Entelea arborescens*, which is most nearly allied to *Sparmannia*, a genus of Abysinnian and South American shrubs or trees, with heart-shaped, toothed, or lobed leaves, and terminal cymes of white flowers. The genus *Sparmannia* derives its name from Dr. A. Sparmann, a Swedish botanist, who accompanied Captain Cook in his second voyage round the world, and introduced into cultivation the well-known *S. africanus*, which is commonly met with in green-houses in Britain.

1. ENTELEA ARBORESCENS (*Brown.*) The Arborescent Entelea.

Specific Character.—Leaves 4–8 in. long, on long petioles, oblique, often lobed irregularly and acutely, doubly or trebly crenate, or serrate; stipules persistent. Flowers white, abundant, in erect cymes, bracteate at the axils, ¾–1 in. diam., drooping. Sepals accuminate; ovary hispid. Capsule the size of a hazel nut; spines nearly an inch long. Seeds in two rows. Albumen oily.—*Handbook of New Zealand Flora, p.* 32.

Description, etc., Plate No. 13.—The "WHAU," or "HAUAMA."—This very beautiful small tree is peculiar to the Northern Island of New Zealand, but it is not common. It is chiefly met with on the outskirts of lowland forests, and fringing deserted clearings. Its attractive, large, bright-green foliage, and handsome white flowers with yellow eye, arrest the attention of the most unappreciative traveller, and marks the forest scenery with a beauty that is rare and exquisite. The tree is small, scarcely ever exceeding ten or twelve feet in height, and is admirably suited to become a magnificent addition to our gardens and shrubberies. The woody branches are used by the Maoris as floats for their fishing nets, and in the construction of small rafts employed by them in laying out their crayfish pots. Owing to the extreme lightness

1. ARISTOTELIA RACEMOSA (*Hook.*, *F.*) The Racemose-flowered Aristotelia.

Specific Character.—A small handsome tree, 6–20 ft. high, with blackish bark and pubescent twigs. Leaves on long petioles, membranous, pubescent, variable in form, 3–5 in. long, ovate-cordate or oblong-lanceolate, acuminate; deeply, irregularly and acutely serrate; often red or purple beneath. Racemes panicled, axillary, many-flowered; peduncles and pedicels slender. Flowers diœcious, small, the males largest, $\frac{1}{6}$–$\frac{1}{3}$ in. diam., nodding. Petals 4, 3-lobed, rosy, of the female flower very small. Stamens numerous, yellow, minutely hairy; anthers larger than the filaments; ovary usually 4-celled. Berry, size of a pea, eaten by the natives.—*Handbook of New Zealand Flora, p.* 33.

Description, etc., Plate No. 14.—The "MAKO-MAKO."—This very handsome, quick-growing small tree is common to both the Northern and Middle Islands. It rarely exceeds twenty feet in height, and does not attain great dimensions. The bark is blackish, and the twigs are covered with short soft hairs. One of the principal features of beauty in this tree is its leaves, which are a rich green on top and crimson below, and have somewhat the appearance of shot silk. As seen from underneath they are semi-transparent, which in the sunlight produces a most charming effect. The grace of the foliage and its varied hues of colour is a delightful spectacle. When in blossom the profuse display of dainty pink flowers, add much to its beauty.

* * * * *

"To rest awhile beneath the Mako's shade,
And feast the eye with vistas draped in sheen;
'Midst leafy visions green with crimson laid,
And glints of sunlight, struggling in between;
A rich delight; where tempting berries sway,
And rays prismatic softly intertwine;
Softening down the purer light of day,
Into shadows delicate and fine."

The Mako-Mako is fully in blossom in the early part of October, the male trees, which display the largest and most numerous flowers, present a charming picture—the female trees are not nearly so handsome. They grow usually on the edges, or in the more open parts of the bush. The flowers have not any perceptible fragrance, and produce no honey. In some districts the tree is known as the "Wine-berry," and wine has been prepared from its abundant and juicy fruit. The berries are about the size of a garden currant, and dark crimson in colour; they are eaten by the Maoris, and the native birds evince a decided partiality for them. The wood is white, very light, and is in request for the purpose of making veneers. Though the tree is abundant, or even common throughout the colony, its general airy and beautiful character, should claim for it a place in our gardens or shrubberies. It is fairly hardy, and young plants can be obtained from nurserymen, or from the bush at the foot of the parent tree. The plant improves under cultivation, and becomes a very pleasing addition around the homestead. The foliage is eaten by cattle, and is not injurious. Our plate is a representation of the male tree in rich profusion of blossom.

2. ARISTOTELIA COLENSOI (*Ho*

Specific Character.--Very similar, in most respects,
to *A. racemosa*, but differing in the much narrower, perfectly
glabrous leaves, which are ovate-lanceolate, narrowed into a
long acuminate point, deeply irregularly serrate; and the

Description, etc.—This small tree is com
mostly as growing in the woods of the Wairara
districts, but its presence has not been ind
A. racemosa, but has much smaller leaves an
handsome as the foregoing. The able comp
the plant in flower,—only, evidently, having
we are unable to speak as to the size or colour
Mr. Colenso, F.L.S., as a further tribute to
botany.

3. ARISTOTELIA FRUTICOSA (*H*

Specific Character.—A small, rigid, erect or decumbent
shrub, with woody tortuous branches, and erect or spreading
downy shoots, with red-brown bark. Leaves very variable, on
short, downy or glabrous petioles, coriaceous, ¼–1 in. long,
ovate-obovate, or linear-oblong, obtuse, entire, crenate-toothed,
serrate or lobed. Flowers minute, usually solitary and axillary,

Description, etc.—This species is comm
Islands, at an altitude of from 2,000 to 4,000
stated by Sir J. D. Hooker, in the "*Handboo*
seem to be only states, determined by age an
Messrs. Hector and Buchanan appear to reg
As in *A. racemosa*, the flowers are polygamo
produced, and are destitute, like the other sp
name is due to the plant being of a shrubby c

GENUS

ELŒOCARPUS (*Linn*

Generic Character.—Trees generally hard-wooded,
with the branches leafy at the extremity. Leaves generally
alternate, exstipulate. Flowers racemose, usually hermaphro-
dite, pendulous. Sepals, 4 or 5, valvate. Petals, 4 or 5,
laciniate, induplicate-valvate. Stamens numerous, seated on a
glandular torus; filaments short, anthers long, awned, pubes-

Description, etc.—A very large tropical
species occurring in Australia and New Ze

sometimes the height of fifty to sixty feet, or are large shrubs. *E. ganitrus*, a tree growing forty or fifty feet high, is a native of India and the Malay Islands, where the hard stones of the fruit are commonly used for stringing into rosaries, or for making necklaces, bracelets, buttons, heads of pins, and similar articles. The genus is represented in New Zealand by the following:—(1.) Elœocarpus dentatus, a small tree having silky twigs and leaves with recurved margins; (2.) Elœocarpus Hookerianus, a small, quite glabrous tree, with smaller flat leaves. The name given to this genus bears reference to the olive-like drupe and stone which characterises it.

1. ELŒOCARPUS DENTATUS (*Vahl.*) The Tooth-leaved Elœocarpus.

Specific Character.—A small tree with brown bark, which yields a permanent dye; branches fastigiate at the top of the naked trunk, silky when young. Leaves erect, petioled, 2 3 in. long, very coriaceous and variable, linear-oblong, obovate or lanceolate, obtuse or acuminate, margins recurved, sinuate-serrate, below often white with silky down, and with hollows where the veins meet the midrib. Racemes glabrous or silky, of many white pendulous flowers ⅓ in. diam. Petals lobed or lacerate. Anthers with a flat recurved tip. Drupe ⅓ ½ in. long, ovoid; pulp astringent but eatable; stone deeply furrowed.—*Handbook of the New Zealand Flora, p.* 34.

Description, etc.—Fig. 1, Plate No. 15.—The "HINAU," or "WHINAU."—This tree is common to both Islands, and is especially plentiful in some parts of the Wellington District. It ascends from almost sea level to an altitude of 2,000 feet on the mountains. On account of the permanent dye that it yields, the Hinau is considered to be valuable. In favourable localities it often attains a height of from fifty to sixty feet, and has a stem from two to three feet in diameter. The wood is a reddish brown, very tough, strong, and durable; it splits freely, and the heart has given satisfactory proof of great durability when employed for economical purposes. It has been used in mines for props and sleepers with marked advantage; and, after a test of many years, has been found to be quite sound and in good condition. It is even asserted that the wood hardens with age. In some localities it is much prized by the settlers for fencing purposes, and serves as fuel. The appearance of the tree when in blossom, in October and November, is charming. The dense green foliage, interspersed with its conspicuous and abundant pendulous, creamy-white flowers, affords a pleasurable spectacle, well worthy the attention of all lovers of nature, and admirably suited for the brush of the artist. The flowers are not fragrant, but they produce large quantities of honey, which is probably secreted by the circle of glands surrounding the base of the stamens. In olden times, the Native chief who was proprietor of a goodly grove of Hinau trees was considered a man of great wealth and importance, since from these his tribe derived a large portion of their sustenance, the berries of the trees affording a rich harvest of food. To rob a Hinau grove was considered by the ancient Maori, a capital offence. The fruit, which grows plentifully in small loose bunches, *(racemes)*, is a small drupe, about the size of a large sloe, having a

peculiarly-shaped, furrowed nut within; its skin is hard, dry, and shining, and of a greyish colour; the outside, or fleshy part, is also dryish, small in quantity, austere, and altogether uneatable in its raw state. These fruits were collected when ripe, in large quantities, and placed in water in the hull of a canoe, or some such large receptacle, where, after steeping, they were well rubbed in the hands, the nuts, stalks, and bits of broken skin strained out, the water carefully drained off, and the grey, coarse meal left as a residuum, made into a huge cake, cooked, and eaten. To bake a big cake through, it often took two days. In colour the cake was a blackish grey, darker than barley or rye bread; the rough, unpalatable taste of the fruit in its raw state being wholly lost in the cooking. This food was greatly esteemed, and, when in season, always made a first-rate dish for visitors. The rats in the forest are exceedingly fond of its kernel, and prove themselves very expert in boring through the hard shell to extract it. The bark of the Hinau yields a permanent blue-black dye, which is used largely for tanning purposes; and, by adding the rust of iron to it, produces an excellent non-corrosive ink. The dye was formerly much in request by the Maoris for colouring their flax mats and baskets, using a mordaunt composed of aluminous clay. The tan-producing properties of the bark of the Hinau is estimated to be second only, amongst New Zealand trees, to the Tanekaha (*Phyllocladus trichomanoides*), and has for years past been an article of export, besides being much sought after by local tanners.

2. ELŒOCARPUS HOOKERIANUS (*Raoul.*) Dr. Hooker's Elœocarpus.

SPECIFIC CHARACTER.—A small quite, glabrous tree, 30–40 ft. high, like *E. dentatus* in habit, but smaller in all its parts. Leaves coriaceous, elliptical or linear-oblong, obtuse, 1½–2 in. long, margins flat, crenate or sinuate-serrate, those of young plants linear and pinnatifid; petioles ¼–½ in. long. Racemes erect, shorter than the leaves, with small, drooping, whitish flowers; Sepals, lanceolate; Petals rather longer, unequally cleft into obtuse lobes. Anthers obtuser than in *E. dentatus*. Drupe small, blue, ⅓ in., with a furrowed, rugose nut.—*Handbook of the New Zealand Flora, p.* 34.

DESCRIPTION, etc.—The "POKAKO."—This species is indigenous to the hilly portions of the Northern, and common on the Middle Island. It is smaller in all its parts to *E. dentatus*, but differs widely from it in its more compact habit, smaller close-set leaves, and small flowers, which are greenish white, and drooping, but very conspicuous by their abundance. Though destitute of fragrance, equally, with those of the "Hinau," they produce a good deal of honey. This tree, in favourable localities, sometimes attains a height of fifty feet, with a trunk two feet in diameter, but is usually smaller. It is noticeable that in young plants the leaves are small, crowded, and variously-shaped, whilst the branches are flexuous and interlacing, in no way resembling the mature trees. The timber is whitish, compact, and difficult to split, but apparently not durable. In some parts of the Middle Island it is often sold as white pine, and has been utilized in the construction of earth-wagons and trucks. It may be used with advantage for a variety of inside work. In the Nelson District this species ascends the mountains to an elevation of 3,500 feet. Its native name is "Pokako," or "Mahi-mahi," but it is very commonly called "Hinau" by the settlers. In the same manner the "Hinau" in the Northern Island is sometimes called "Pokako."

1. LINUM MONOGYNUM (*Forst.*) The One-styled Flax.

Specific Character.—A perennial, variable herb, sometimes woody at the base, simple or branched, 6-12 in. high, erect or decumbent. Leaves, ¼-1 in. long, oblong-linear or linear-subulate, 1-3-nerved. Flowers numerous, white or pale blue, very variable in size. Sepals, ovate-lanceolate, acute. Styles united, their free tips recurved. Capsule, globose, of 10 cocci.—*Handbook of the New Zealand Flora, p.* 35.

Description, etc.—Fig. 2, Plate No. 15.—The "RAUHUIA" or "KAHO."—This interesting little plant is common, especially on rocky coasts, throughout both Islands, and ascends 2,000 feet in the mountains of Canterbury. It is likewise indigenous to the Chatham Islands. Two varieties are named, the one (*grandiflorum*) being erect and branched, with numerous flowers one-half to one inch across; whilst the other (*diffusum*) is decumbent, with few flowers, one-quarter to half an inch in diameter. Our plate represents a figure of the erect variety, a very chaste and beautiful plant. The Linum family has been largely introduced into British gardens, and all possess handsome flowers of various hues and colours—white, yellow, blue, rose and parti-colour. *L. narbonense*, a native of Spain, is said to be the most beautiful of the species, and *L. usitatissimum* the most useful. The latter is only known at the present day as a cultivated plant, or as occurring in a semi-wild state in places where it has escaped from cultivation. In some parts of New Zealand it is frequently to be seen by the road-sides and in the ditches asserting its right to domicile. Being a hardy plant, when once located it spreads quickly. History tells us that this species has from time immemorial been cultivated for its tenacious fibre, it being one of those plants which the wants of man early taught him to use. The Bible affords us ample proof of the antiquity of the use of flax as a material for weaving cloth, and the long period during which it has been an object of culture has, doubtless, as in other known instances, so altered the appearance of the plant that it is not recognizable in its original form, if such exists at the present day. Microscopists have proved that the cloth used by the ancient Egyptians for wrapping round mummies, the antiquity of which is undeniable, was made of flax. Flax and linen formed an article of commerce between the ancient Egyptians and Greeks. The plant was also cultivated by the early Romans; but, as their clothing was chiefly made of wool, it did not find much favour. In modern times the culture of flax is widely spread in the Northern Hemisphere, extending from the tropics of India and Egypt to the northern parts of Europe. Besides the fibre of the flax plant, its oily seeds, known as linseed, are a commercial article. The finest kind of oil is the product of simple pressure, and is called "cold drawn;" but the ordinary kind is obtained by breaking up, beating, and re-pressing the cake left after the last process. It is a non-drying oil; but, by boiling with sugar of lead, red lead, or white vitirol, it is converted into a drying oil fit for the use of painters. The cake is greatly valued by agriculturalists

CHAPTER XIII.

ORDER XIII.—GERANIACEÆ. (The Crane's-bill Family, including Oxalideæ.)

CHARACTER OF THE ORDER.—Herbs, with leaves opposite or alternate, and regular or irregular hermaphrodite flowers. Sepals, 5, free, imbricate, one sometimes spurred. Petals, 5, rarely fewer, imbricated. Disk, inconspicuous or glandular. Stamens, 10, hypogynous, the alternate ones often smaller or imperfect, or without anthers; filaments often connate below; anthers, versatile. Ovary, 3-5-lobed, or 3-5 carpels combined in the axis, produced into as many free or connate styles, with capitate or longitudinal stigmas; cells, 1-or more ovuled. Fruit capsular, 3-5-lobed, 3-5-valved, variously dehiscing. Seeds with little or no albumen.—*Handbook of the New Zealand Flora, p.* 35, and *Additions and Corrections, etc., p.* 726.

DESCRIPTION OF THE ORDER.—

VERY large order, containing many genera absent in New Zealand, differing a good deal in structure to some of which the above character does not altogether apply. The plants of this order are distributed over various parts of the world. They have astringent and aromatic qualities, many of them are fragrant, and some have an odour of musk. They are sometimes tuberous, and the tubers are eaten. There are numerous hybrids among the plants, and it is not easy to determine the exact number of species, but about 540 are recorded, which include the genera **ERODIUM**, **GERANIUM**, **PELARGONIUM**, and **MONSONIA**, as examples. The genera confined to New Zealand consist of:—(1). **GERANIUM**, flowers regular, styles combined; (2). **PELARGONIUM**, flowers irregular, calyx with a spur adnate to the pedicel; and (3). **OXALIS**, flowers regular, styles free, leaves 3-foliolate. The name "Crane's-bill," given to this family, is derived from the long central beak of the fruit having a resemblance to the head of that bird, and which is peculiar to the genera **GERANIUM** and **PELARGONIUM**. Botanists apply the term "Pelargonium" to that section of the great family of Crane's-bills which has irregular or unsymmetrical corollas; those that have regular corollas being, by them, called Geraniums.

S. Featon

COPYRIGHT.

GEN

GERANIUM (*Lin*

Generic Character.—Stemless or branching herbs,
with stipulate leaves and axillary, 1–2-flowered, 2-bracteolate
peduncles. Flowers, regular. Torus with 5 glands alternating
with the petals. Stamens, 10, all perfect (rarely 5, imperfect),
free or united at the base. Ovary, 5-celled, beaked; beak

Description, etc.—A large genus, the
all temperate regions of the globe. Some
are well worth cultivating, and are often se
called geraniums are now removed to t
difference in the calyx. The other differen
the geraniums the petals, which are large an
they are unequal, the upper two being large
are mostly hardy or greenhouse perennials.
or perennial-rooted, and the roots possess astr
dissectum: Peduncles, 2-flowered, pink;
(2.) *G. microphyllum:* Peduncles, 1-flowe
carpels, hairy; seeds, scarcely dotted. (
pink; sepals, awned; carpels, hairy; se
Peduncles, 2-flowered, pink; sepals, not aw
G. Traversii: Peduncles, 1-flowered; sepa
name "Geranium" is said to be derived f
allusion to the long beak of the fruit bearin

1. GERANIUM DISSECTUM (*Linn.*) T

Specific Character.—Stem, 1–2 ft. high, stout, erect or
decumbent, branched more or less, covered with spreading,
usually retrorse, hairs. Leaves, 1–2 in. diam., on long petioles,
orbicular, deeply cut into few or many broad, or narrow,
obtuse or acute lobes; stipules broad, scarious. Peduncles

Description.—Fig. 1, Plate No. 16.—
abundant throughout both Islands, and is a
from Canada to Cape Horn. It is describe
biennial. The talented compiler of the
annual in Canadian and United States
America, Rocky Mountains, and Chilian o
the sepals in the United States form, becom
Zealand form differs from the European

larger, always less notched, and the root always more than annual; but these distinctions are said not to be constant. The amount and depth of pitting of the seed varies much in different specimens. The species ranges through temperate Australia and North and South America, in which latter country it has several names. Of the four species peculiar to New Zealand *G. dissectum* is the largest and handsomest, the pink flowers of which often measure three-quarters of an inch across, and are produced very abundantly. It commences to bloom early in Summer, and often continues until late in Autumn. In country districts it is found growing luxuriantly on the road-sides and bordering the ditches; in fact, wherever the land has been cleared, or burnt off, it springs up spontaneously and grows with vigour. The native name of the plant, "Matua-kumara," means, literally, "the father or parent of the Kumara;" and, as it grows prolifically in their plantations, the Maoris may in some manner believe that its presence augurs well for, and ensures the increased growth of, their much-esteemed product the Kumara. In times of scarcity, the root of this species was eaten as food. Unimportant as this little plant is from a floral point of view, it reminds us of the very beautiful members of its family which ornament, with luxuriant growth, our colonial gardens—offshoots of the handsome European and African species, adorning the greenhouses and gardens of the fair land of Britain. Some of our readers may feel surprised to hear that many of our so-called handsome Geraniums displayed at exhibitions, with their brilliant and varied colours of leaf and flower, are classified by botanists under the genus PELARGONIUM. Most of the species are astringent, particularly the North American *G. maculatum* or "Alum-root," the rhizome of which is used in its native country instead of Kino. The Tasmanian *G. parviflorum* is there called the "Native carrot," and its tubers are used as food. There are about a dozen British species. The specific name of *dissectum*, given to the subject of our plate, is in allusion to the much cut form of its leaves, which make the plant at all times very distinguishable. The varieties are:—*pilosum*, covered with spreading hairs, petals often large; *patulum*, leaves covered with spreading and retrorse hairs, petals usually small; and *glabratum*, more glabrous, with leaves 3 to 5-lobed, and with the lobes broader.

2. GERANIUM MICROPHYLLUM (*Hook.*, *F.*) The Small-leaved Geranium.

SPECIFIC CHARACTER.—Leaves orbicular, ¾-1 in. broad, usually cut to or below the middle into 5–7 broad, obcuneate, toothed, obtuse lobes; petioles slender; stipules small. Peduncles rarely 2-flowered. Flowers smaller than in *G. dissectum* (var. *patulum*), excepting in fine specimens; the sepals with very short awns; and the petals larger in proportion, white or pale-pink, retuse. Carpels even, with short hairs. Seeds minutely dotted.—*Handbook of the New Zealand Flora*, *p.* 36.

DESCRIPTION, etc.—A very slender, prostrate, straggling, branched plant, 12 to 15 inches long, more or less covered with silky white, appressed spreading hairs, often retrorse

on the peduncles and pedicels. It is con
situations. It has small, pale-pink fl
Altogether it is of a much more slender

3. GERANIUM SESSILIFLORUM

Specific Character.—Stemless or nearly so ; root, stout
branches, if present, very short, and leaves more or les
covered with silky hairs, which are spreading or retrorse o
the petioles, pedicels, and sepals. Leaves, mostly radical, ver
numerous, on long slender petioles, 3–6 in. long, orbicula
cut to or below the middle into cuneate 5–7-fid lobes ; stipule
broad, membranous. Peduncles short, from the root, o

Description, etc.—This plant is indi
Island, Otago, Chalky Bay, and the terr
Tasmania, on the Australian Alps, and i
dissectum (var. *pilosum*), except in habit
it bears is in allusion to the almost stemles
up from the root or from very short branc

4. GERANIUM MOLLE (*Linn.*)

Specific Character.—A procumbent, much-branched,
slender plant, covered with soft spreading hairs. Leaves, 1 in.
broad, orbicular or reniform, more or less 5–9-lobed, the
segments 3–5-fid ; petioles long ; stipules very broad and
membranous. Peduncles, 2-flowered, with broad membranous

Descripton, etc.—This little plant is
Europe, and extends eastward to the Hi
not native of any part of Australia or
character from *G. dissectum*, having leave
accordance with the accepted form of g
only two of which are displayed on the s
to the soft, tender, and mollient habit of
flowers has been found at New River H
G. molle, but with much heavier foliage.

5. GERANIUM TRAVERSII (*Hook.*, *F.*) Mr. Travers' Geranium.

Specific Character.—Hoary all over, and almost silvery with fine white pubescence. Stems, 1–2 (?) ft. long, rather stout. Leaves long, petioled, orbicular, 1½ in. diam., 7-lobed to the middle; lobes cuneate, 3-fid, both surfaces equally hoary; stipules broad, almost orbicular, cuspidate. Peduncle 4 in. long, 1-flowered, slender, with 2 ovate-lanceolate acuminate bracts in the middle. Flower large, 1 in. diam. Sepals broadly ovate, cuspidate, silky. Petals orbicular-ovate, quite entire, much larger than the sepals, white.—*Handbook of the New Zealand Flora* (*Additions and Corrections, etc.*) *p.* 726.

Description, etc.—Fig. 2, Plate No. 16.—"Mr. TRAVERS' GERANIUM."—This very handsome plant is found only at Chatham Island, where it is common on waste ground. It is not known to occur on the mainland of New Zealand. To Mr. Travers, of Wellington, is due the honour of having introduced this beautiful plant to the botanical world, he having collected it upon one of his visits to the Island in or about the year 1871. The specific name accorded to it is in compliment to that gentleman. Our figure on Plate No. 16 indicates clearly the grace and beauty of this charming addition to our native geraniums.

GENUS II.

PELARGONIUM (*L'Heritier.*) The Native Pelargonium.

Generic Character.—Herbs (rarely shrubs), with opposite, simple-lobed or dissected, stipulate leaves, and 1-or many-flowered axillary peduncles. Flowers slightly irregular. Sepals, 5, the upper produced into a spur, which is adnate with the pedicel. Petals, 5 or fewer, the upper often dissimilar. Torus with 5 glands. Stamens, 10, of which only 7, or fewer, are antheriferous. Ovary and fruit as in *Geranium*. —*Handbook of the New Zealand Flora*, *p.* 37.

Description, etc.—A very extensive genus almost confined to the Cape of Good Hope, though a few species occur in Australia, one in the Canary Islands, one in Asia Minor, and one in New Zealand. They are known very generally in gardens as geraniums, though very different from the genus of that name in their spurred calyx, usually irregular corolla, and the number of perfect stamens, which varies from seven down to four. The greater number of forms cultivated in gardens are hybrids, which are produced with great facility in this genus. The species possess more or less of the astringent properties of the order, but one species at least (*P. triste*) has tubers, which are eaten at the Cape of Good Hope. Some have fragrant foliage, from which an essential oil is extracted, as *P. roseum* and *capitatum*. The leaves of *P. acetosum* and *peltatum* are edible and gratefully acid. The genus is divided into fifteen sub-genera, which vary very much in habit. Some have a turnip-shaped root and no proper stem; others have a distinct leafy stem; and a good number are under-shrubs with thick fleshy stems.

1. PELARGONIUM AUSTRALE
Pe

Specific Character.—A more or less hairy, perenn
herb ; stem erect, simple or branched, 4 in.–2 ft. high. Lea
orbicular or ovate, deeply cordate at the base, 3–5-lobed, lot
coarsely or finely toothed, or serrate. Petioles slender, 2
in. long. Peduncles axillary, longer than the leaves, pub
cent, many-flowered. Flowers small, ½ in. broad, in 10–1
flowered umbels, with whorled, ovate, acuminate bracts at t

Description, etc.—Fig. 2, Plate N
herb is abundant throughout both Isl
found in Tristan d'Acunha, South Afri
foot in height, and displays numerous u
but many together; and, when minut
miniature some of the fancy garden v
similar to the larger and well-known sor
nearly all the summer. Towards the l
dryer weather, its leaves turn from green
presenting a very pretty effect. The le
from four and a-half to five inches in d
by the Maoris to reduce inflammation in
serviceable as a poultice to effect a speed
horses. Kopata springs up indigenousl
becomes a hardy weed. A prostrate vari
Hamilton as growing in the Southland D
inches or more, with dark brownish-pu
almost creeping stem. The rootstock is
small, slightly irregular, and pure whit
account of its recumbent habit.

GI

OXALIS (*Lin*

Generic Character.—Stemless or branching, usuall
slender, perennial, acid herbs, with alternate or tufted, usuall
stipulate, 3-foliolate, or pinnate leaves, and obcordate leaflet
Flowers regular. Sepals, 5, imbricate. Petals, 5, contorte
Disks and glands, none. Stamens, 10, all fertile. Ovar

Description.—A very large genus,
tropical America and at the Cape of Goo
and one, *Oxalis scandens*, from Mount Q

far the greater number have a stem reduced to a rhizome, sometimes subterranean, sometimes appearing above ground, and often taking the shape of a bulb or forming a tuber. In these the leaves are all produced in a tuft. In some of the bulbous species, as *O. cernua,* bulbs are also produced in the axils of the leaves. The leaves of most of the species consist of three entire leaves, which are usually inversely heart-shaped (such are the New Zealand species), and occasionally slightly sensitive, as in *O. stricta.* The leaves contain an acid juice. Sometimes the leaflets are reduced to two, or even one, when the leaf appears to be simple; and, finally, a few have even this solitary portion deficient, which occurs in such specimens as *O. fruticosa* and *O. leptopodes,* which have flat, dilated, leaf-like petioles. One section of the genus (*Biophytum*) has pinnate leaves, with many pairs of pinnæ, but no terminal leaflet. In one of these from India, *O. sensitivæ,* these compound leaves are nearly as sensitive as in the "Sensitive plant," for they contract on the slightest touch. Three specimens occur in Britain. One of these, the common wood sorrel, *O. acetosella,* has a scaly rhizome, with a tuft of leaves at the top, and solitary white flowers more or less veined with purple. This plant has a pleasant acid taste from containing binoxolate of potass; and hence it was once used in medical practice as a refrigerant in fever, and as an anti-scorbutic in scurvy. It still remains in the British Pharmacopeia, though fallen into disuse. The other British specimens are *O. corniculata* and *O. stricta.* *O. acetosella* is said to be the Shamrock of Ireland, though some prefer *Trifolium,* and other plants have been suggested. The New Zealand species are:—(1.) *O. corniculata:* stems, elongate, branching; flowers, yellow. (2.) *O. Magellanica:* Stems, short or none; flowers, white. The foliage of both affords a grateful acid.

1. OXALIS CORNICULATA (*Linn.*) The Native Oxalis.

Specific Character.—An erect or decumbent, branched, slender, glabrous or pubescent herb, usually with a perennial root; branches. 1–10 in. long, erect, ascending, or more usually prostrate, sometimes matted together. Leaves, 3-foliolate; leaflets deeply obcordate, $\frac{1}{8}$–1 in. long, glaucous below; stipules, small or none; petioles slender, very variable. Peduncles, axillary, 1–6-flowered, variable in length. Flowers most variable in size. Petals, yellow, notched. Capsules, oblong or linear.—*Handbook of the New Zealand Flora, p.* 38.

Description, etc.—Fig. 4, Plate No. 16.—The "NATIVE OXALIS."—This little herb is abundant throughout both Islands, especially on the eastern coasts, in dry sunny localities. There are five known varieties of this plant, all of which differ in habit, some being erect, some rigid, and some creeping. The Oxalis commences to bloom late in September or early in October, and continues, almost uninterruptedly, to display its brilliant little yellow flowers until late in Autumn. During the extreme heat of Summer it appears to languish somewhat, when the blooms are not so plentiful; but it revives with the cooler weather, and continues to bloom vigorously until the sunny days become

few, towards the end of May. It ha
flowers on sunny days, but it is not a
expanded flowers displayed on a very cl
The flowers vary in size on different pla
diameter. They are said to contain a gc
fertilization they are supposed to be de
acid flavour similar to the common wooc
of the genus are in cultivation, the flowe
in colour. One of them, *O. crenata,* ha
which are yellow, streaked with purple.
about Lima for its very acid leafstalks a
the one which, some years ago, was intro
The tubers are soft and watery, and re
appearance they are similar to the potato
substitute for that edible; but this, ho
considered insipid, and the produce small
leaves have been recommended as a subs
of using them, however, is in salads.

2. OXALIS MAGELLANICA (

SPECIFIC CHARACTER.—A small, glabrous or pubescen
stemless, rather succulent species, 3–4 in. high. Rhizom
creeping, perennial, covered with imbricate scales (old stipules
Leaves, 3-foliolate; leaflets, broadly obcordate, glabrou
glaucous below. Petioles usually hairy. Peduncles radica

DESCRIPTION, etc.—Fig. 5, Plate No
both Islands, being found in the damp
rills in the sub-alpine and alpine regions.
among the snow, in full bloom. It is ve
O. acetosella, and is recorded in the "*H*
Horn. On this account it bears the n
common in similar situations in Tasmani
vary in size. Like *O. corniculata* they a
honey. The foliage has an acidity, pleas

CHAPTER XIV.

ORDER XIV.—RUTACEÆ. The Rue Family.

CHARACTER OF THE ORDER.—Shrubs and trees. Leaves opposite or alternate, exstipulate, pellucid-dotted, usually fragrant, simple or compound. Flowers, regular, hermaphrodite. Sepals and petals, 4 or 5, spreading, imbricate or valvate. Stamens, usually 8 or 10, free, inserted at the base of a tumid disk; anthers, versatile. Ovary, of 4 or 5 more or less united carpels; styles, 4 or 5, wholly combined, or by a capitate stigma only; cells, 2-ovuled. Fruit capsular, of 4 or 5 coriaceous, 2-valved, 1-seeded cocci; outer coat separating from the inner, which is chartaceous, dry, and elastic. Seeds, oblong; testa, crustaceous; albumen, copious or none.—*Handbook of the New Zealand Flora, p.* 39.

DESCRIPTION OF THE ORDER.—

CONSTITUTES a very large natural order of trees and shrubs, rarely embracing herbs, including the Rue, Orange, Cape Diosmas, Australian Boronias, and many other plants differing in certain points from the above ordinal character, abounding in the temperate regions of the Southern Hemisphere, especially in South Africa and Australia. Taken in its most extended sense, the order is divided into seven tribes; several of which, and not always those which are most distinct in character, are often considered as separate orders. They are:—*Cusparicæ:* natives of tropical America; *Ruteæ:* dispersed over the temperate regions of the Northern Hemisphere; *Boronieæ:* natives of Australia; *Xanthoxyleæ:* dispersed over the tropical regions of both the Old and New World; and *Toddalieæ:* chiefly tropical, in both the New and the Old World. The leaves are frequently opposite, simple, or more generally compound, always more or less marked with glandular dots, and often strongly scented. The flowers are usually hermaphrodite and regular, sometimes showy, and often sweet scented. The fruit is a capsule or berry, rarely a drupe. The name of the order is taken from the genus *Ruta,* which derives its name from the Greek word *rus,* to preserve, in allusion to the effects of the medicinal properties of the

1. PHEBALIUM NUDUM (*Hook.*) The Naked Phebalium.

Specific Character.—A shrub or small tree, 12–15 ft. high, everywhere glabrous; branches very slender. Leaves, alternate, 1–1½ in. long, spreading. linear-oblong or narrow oblong-lanceolate, obtuse, obscurely crenate, narrowed below into very short petioles, coriaceous, paler, and dotted below. Flowers in terminal, many-flowered corymbs, whitish, ¼–⅓ in. diam., on pedicels ⅙–¼ in. long. Calyx very small, 5 lobed. Petals, 5, linear, obtuse, with narrow overlapping margins. Cocci, ⅙ in. long, obtusely rhomboidal, compressed, wrinkled; often only one ripens, splitting down the front and back into 2 valves.—*Handbook of the New Zealand Flora, p.* 39.

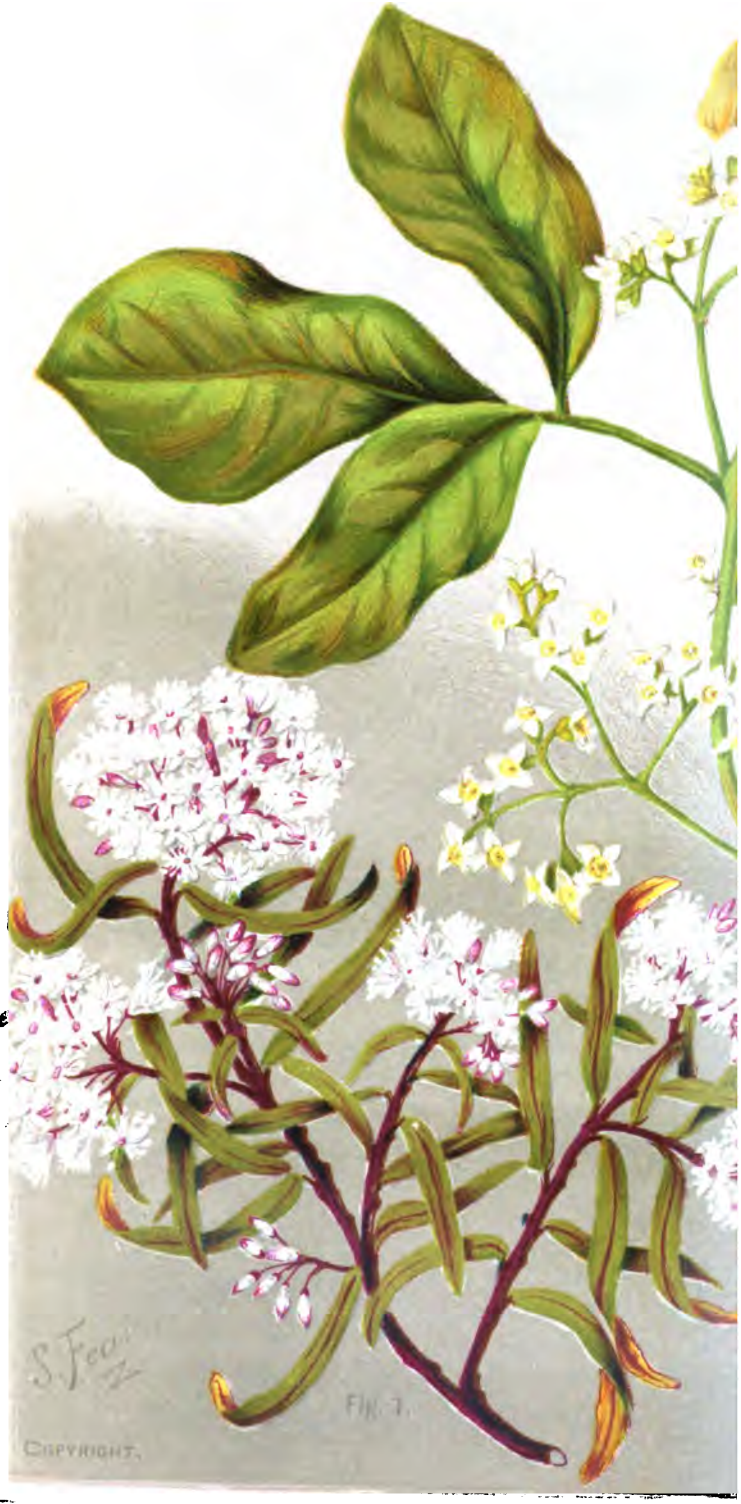
Description, etc.—Fig. 1, Plate No. 17.—The "MAIREHAU."—This shrub is peculiar to the northern portion of the Northern Island, and is most prolific at the Bay of Islands. The whole of its parts possess a strong, fragrant, resinous smell, to which the Maoris are very partial. It is not an unusual occurrence for the Natives to adorn their hats with sprays of its thin lithesome branches when they make excursions into the woods after the wild pigeon. The reason of this adornment is not easy to discover, unless the native sportsmen suppose that the foliage may deceive the birds they are in pursuit of, and permit them to get closer up to their game; or, it may be, that they have a *penchant* for the perfume, which they are pleased to gratify. The specific name of the "Mairehau" is due to the entire absence of hairs or downy covering over its entire parts—being, as it were, naked. The foliage is a bronze green colour, intermingled with splashes of red, presenting a very singular appearance, and giving the impression that the leaves are metallic. They retain their fragrance for a length of time, even after they have been dried. Sir J. D. Hooker says, in his notes, that the New Zealand species is closely allied to the Queensland *P. elatius*, but the flowers are larger, the petals longer, the corymbs more flattened, and the leaves taper less to the base; and that they may prove to be local forms of one species. A reference to our plate will familiarize the reader with the general appearance of the Mairehau, where its pretty corymbs of myrtle-like white flowers and pink buds are carefully portrayed.

GENUS II.

MELICOPE (*Forst.*) The Melicope.

Generic Character.—Glabrous shrubs. Leaves, opposite or alternate, simple or compound, pellucid dotted. Flowers, in axillary, many or few-flowered cymes, more or less uni-sexual. Sepals, 4, deciduous or persistent. Petals, 4, sessile, spreading, valvate or imbricate, with inflexed tips. Stamens, 8; filaments, subulate. Ovary, 4-lobed, 4-celled; style, 1, or 4 coalescing into 1 from between the lobes; stigma, capitate; cells, 2-ovuled. Cocci, 1–4, spreading, free; endocarp, separating. Testa, shining; albumen, abundant; embryo, slightly curved.—*Handbook of the New Zealand Flora, p.* 29.

Description, etc.—A Pacific Island genus, very variable in habit, which does not extend westward into Australia. The two New Zealand species, *M. ternata* and *M. simplex*, are extremely dissimilar in habit. In the first named the leaves are opposite and 3-foliolate; whilst in the latter the leaves are alternate or fascicled, and 1-foliolate.



1.—Phebalium nudum.   2.—

CHAPTER XV.

ORDER XV.—MELIACEÆ. The Melia Family.

CHARACTER OF THE ORDER.—Trees (rarely shrubs). Leaves, usually pinnate, alternate, exstipulate. Flowers, regular, generally hermaphrodite. Calyx, small, 4 or 5, lobed or parted, imbricate. Petals, 4 or 5, contorted, valvate or imbricate, often long, sometimes united to the staminal tube. Disk, free, or wanting, sometimes tubular within the stamens. Stamens, usually 8 or 10, more or less united into a tube, bearing the sessile anthers within its mouth, which is often toothed or split. Ovary, free, 3–5-celled; style, single, terminal; stigma, capitate; cells, 2-ovuled. Fruit, a drupe, berry, or capsule, usually the latter, coriaceous, 3-celled, loculicidally 3-valved. Seeds generally solitary in the cells, mostly arillate and exalbuminous.—*Handbook of the New Zealand Flora, p.* 40.

DESCRIPTION OF THE ORDER.—

THIS is a very large order of tropical forest trees, of which various genera present characters of the flower and fruit at variance with the above description. They are chiefly found in the equatorial parts of America and Asia, and possess bitter tonic and astringent properties. The Mahogany, *Swietenia mahagoni*, the Satin Wood, *Chloroxylon swietenia*, and the Pride of India, *Melia azedarachta*, all belong to this order. *Melia azedarachta* is used in India as a febrifuge, and its fruit yields an oil, which is used for domestic purposes and as an anti-spasmodic. The root is bitter, and is employed as a vermifuge. Oils are also produced from species of *Trichilia* and *Carapa*. There are upwards of 40 genera in the order, and above 180 species. New Zealand is represented by only one species, *Dysoxylum spectabile*.

(*Prosthemadera Novæ Zelandiæ*) extracts, with its long brush-tipped tongue, the much-relished nectar. In common with many other New Zealand trees, both fruit and blossom are displayed at the same time. The flower is called "Tapia" by the Natives. Both blossom and fruit are carried on a pedicel or branch, springing directly out of the trunk or branch of the tree. The aril, or fruit, is eaten by the wild pigeon, (*Carpophaga Novæ Zelandiæ*), with avidity. The foliage, owing to its bitter flavour, is distasteful to cattle and sheep. The Kohekohe was originally known botanically as *Hartighsia spectabilis*, so named by A. Jussieu, a celebrated French systematic botanist. The careful and graphic delineation of this tree in our plate will convey to the reader, in a forcible manner, the interesting peculiarities of this useful and beautiful member of our New Zealand flora.

1. PENNANTIA CORYMBOSA (*Forst.*) The Corymbose Pennantia.

Specific Character.—A small, very graceful tree, covered with white, sweet-smelling flowers, 20–30 ft. high; bark, whitish; wood, brittle; twigs and young cymes, pubescent. Leaves on short petioles, 1–3 in. long, ovate, obovate or oblong, obtuse, sinuate or toothed, rarely entire, often turning black in drying. Male flowers largest. Filaments longer than the petals; ovary reduced to a papilla; pedicels jointed below the calyx. Berries, ovoid, black, fleshy, with purple juice, ⅓ in. long.—*Handbook of the New Zealand Flora, p.* 42.

Description, etc.—Plate No. 19.—The "KAIKOMAKO."—This very graceful small tree, which, in the season, produces an abundance of sweet-scented flowers, is indigenous to both Islands, but is most common throughout the Middle Island. In the North it is chiefly found in mountain woods. It seldom grows more than 30 feet in height, and blossoms in December, when it is indeed a spectacle, being mostly covered with cymes of handsome, fragrant, white flowers. The bark is whitish, not unlike that of the Pukatea, *(Atherosperma Novæ Zelandiæ)*. The wood is white, very brittle, but splits freely. In former days the Maoris used this wood in conjunction with that of the Hinahina, *(Melicytus ramiflorus)*, or other woods of a soft nature, to obtain fire by friction. On this account the tree was much prized, and bore an economic value, which it does not at present. The process employed in this very useful proceeding was exceedingly tedious, not to say laborious. A stick of the Kaikomako, having been well dried and scraped, was rubbed vigorously backwards and forwards upon another piece of wood selected for a bed. The continued pressure and friction caused shreds of carbonized fibre from the woods in contact to accumulate at the base of the stick, which, in due course, commenced to smoke and then ignite. It is needless to say that this primitive method to obtain fire is now, except under extreme circumstances, or by way of experiment, dispensed with, the Maori finding the burning glass or the wax match of the Pakeha more satisfactory and more expeditious for the purpose. The pretty, egg-shaped berries are described by the "*Handbook*" as black; but, as a matter of fact, they are purple when ripe, as shown in our plate. In the Middle Island the Kaikomako is often confounded by the settlers with the Ribbon Wood trees, (*Hoheria populnea,* and its varieties,) they being very similar in general appearance. The foliage of the Pennantia in its young state is small and rounded; but, as the tree matures, the leaves assume an oblong character, measuring nearly three inches in length. The wood has no specific value, nor is the tree known to possess any medicinal properties. In suitable localities it should prove a very graceful addition to shrubberies and hedgerows as an ornamental tree.

* * *

CHAPTER XVIII.

ORDER XVIII.—RHAMNEÆ. The Buckthorn Family.

CHARACTER OF THE ORDER.—Trees or shrubs. Leaves alternate, rarely opposite, stipulate. Flowers regular, hermaphrodite. Calyx, superior or inferior, 4 or 5-toothed or lobed; lobes triangular, valvate, often having a raised ridge down the centre, and an incurved thickened tip. Petals 0, or 4 or 5, minute, scale-like, very concave, placed between the teeth of the calyx, and often smaller than them. Stamens, 4 or 5, very small, inserted with the petals, opposite to, and often hooded by them. Disk hypogynous or epigynous. Ovary, superior or inferior, 3-celled; style, 1; stigma, capitate or 3-fid; ovule solitary, and erect in each cell. Fruit of 3 cocci, either free and subtended by the calyx, or more or less immersed in, or adnate to the calyx; cocci often crustaceous, lenticular, dehiscing down the inner face. Seed, erect; albumen, fleshy; embryo, large; cotyledons, orbicular; radical straight, terete.—*Handbook of the New Zealand Flora, p.* 42.

DESCRIPTION OF THE ORDER.—

EMBRACES trees or shrubs inhabiting the tropics, in the mountainous regions of India and Abyssinia, and the temperate countries of both hemispheres. The majority of the species are shrubs, varying from one to eight or ten feet high, though some occasionally grow as high as fifteen or twenty feet, and form small trees, many of them being armed with stout spines. The Alaternus (*R. alaternus*), is an evergreen shrub or small tree, native of the South of Europe and North of Africa, of which several varieties are grown for ornamental purposes in English gardens. It has smooth, serrated leaves, varying from egg-shaped to elliptical or lance-shaped, and green flowers of separate sexes, without petals. It was introduced into Britain in 1629. *R. catharticus*, the Purging Buckthorn, is a native of Britain. It is a stiff, very much branched shrub, growing from five to ten feet high, frequently having branches terminating in a sharp thorn-like point. The flowers are yellowish-green, with very narrow petals, and grow in dense clusters. The berries, which are black and shining, are about the size of a pea. The juice of the unripe berries is of the colour of saffron, and is used for staining paper. The seeded pieces into which the fruit separates not splitting in halves, but having a large opening on the inner face. The generic name is derived from the Greek words *poma,* a covering, and *derris,* a skin, in reference to the manner in which the fruits are loosely invested by the tube of the calyx. Several Australian species, such as *P. apetela, P. discolor, P. betulinus, and P. elliptica* (the Kumarahou of the Maori), and others, are occasionally met with in green-houses in Britain. They produce a profusion of small yellowish-brown or whitish flowers, and are much admired. *P. apetela* forms a small tree in New South Wales, and yields a hard, close-grained wood, there called "Cooper's wood." The New Zealand species consist of:—(1.) *P. elliptica,* with elliptic leaves, two to three inches long, and cymes many-flowered. (2.) *P. Edgerleyi,* with oblong leaves three-quarters of an inch in length, and racemes many-flowered. (3.) *P. phylicifolia,* with linear leaves one-quarter to half an inch long, and cymes few-flowered. (4.) *P. Tainui,* with elliptic oblong leaves, obtuse at both ends, and cymes many-flowered.

1. POMADERRIS ELLIPTICA (*Labill*). The Elliptic-leaved Pomaderris.

Specific Character.—A branching shrub or small tree, covered, except on the upper surface of the leaf, with stellate, white or grey down. Leaves, 2–3 in. long, elliptic-oblong, obtuse at both ends, or acute at the tip, quite entire, white below; petioles, ⅓ in. long. Cymes terminal, much-branched, very many flowered, 2–6 in. diam. Flowers fragrant. Calyx tomentose, and covered with silky hairs. Petals with crisped margins.—*Handbook of the New Zealand Flora, p.* 43.

Description, etc., Plate No. 20.—The " KUMARAHOU."—This fragrant shrub is indigenous to the Northern Island only. It is abundant on the dry hills towards the north of Auckland, particularly in certain portions of the Bay of Islands District. It was first discovered by Banks and Solander, the botanists who accompanied Captain Cook on his visit to these Islands in 1769. Its presence is rather a sure indication of a poor and sterile soil. Nevertheless, when the hill-sides are adorned with the rich golden blossoms of the " Kumarahou," in the month of October, the scene is a lovely spectacle. The handsome and variegated foliage, mixed with the old gold-coloured masses of blossoms, presenting a most tasteful and charming combination. This same plant is common in many parts of temperate Eastern Australia, and Tasmania. It is generally believed that the Kumarahou cannot be grown successfully in rich or generous soil, but experiments in that direction have proved to the contrary. In fact, under liberal treatment the plant has been found to show a marked improvement both in flower and in foliage. To those of our readers who are fond of a handsome shrub we would strongly advise them to introduce this beautiful Pomaderris into cultivation, as it will well repay for the trouble. As faithfully as we have portrayed the plant, there still remains a beauty untouched, which the skill of the artist's pencil and the finest combinations of colour fail to effect.

are produced at the ends of the branches. The leaves of the Tauhinu are small, leathery, and have a peculiar rolled form, the margins curling back to the mid rib, whilst the surface is deeply grooved down the middle. This plant is common in Tasmania. Its specific name is due to the heath-like appearance of its foliage.

4. POMADERRIS TAINUI (*Hector.*) The Tainui Pomaderris.

SPECIFIC CHARACTER.—A small, shrubby tree, 20 ft. high, with numerous irregular branches; smooth, brownish-grey bark. Young branches and under side of leaves covered with white stellate tomentum; leaves, 2–4 in. long, elliptic-oblong, obtuse at both ends, irregularly crenulate, glabrous and dark-green on the upper surface, with distant stellate bases on young leaves, principal veins very prominent, buff coloured. Flowers small, in open thyrsoid panicles, leafy at the base, buds nearly globular; calyx, about 1¼ lines long, with stellate leaves, the tube being very short. Petals, none. Anthers tipped by a small gland; styles divided to the middle, with club-shaped, almost capitate, stigmas; capsule not seen. —*Transactions and Proceedings of the New Zealand Institute*, 1878, *Vol. XI.*, *p.* 428.

DESCRIPTION, etc.—This small tree is a very local plant, being confined to about an acre of ground on a spur of the low sandy hills that extend along the coast, between the Mokou and the Mohakatina Rivers, on the West Coast of the Northern Island. It was first discovered by Sir James Hector, in 1878, during a visit to the Mokau District, under circumstances of much interest, the story of which is best told in his own words, as rendered to a meeting of the members of the Wellington Philosophical Society, in January, 1879:—"The peculiar habit of the tree," he remarked, "first attracted my attention, having resemblance to a clump of apple trees, so that, at first glance, I thought it to be an old orchard or cultivation. I afterwards was much interested in hearing from the Natives that a peculiar tree was growing on the spot where their ancestors first camped when they abandoned the Tainui canoe, in which they came from Hawaiki, and that this tree had sprung from the rollers or skids and the green boughs that were brought as flooring to the great canoe. On my doubting this, they offered to take me to the place, and if I could not recognise the tree as being found elsewhere in New Zealand, they would consider it as proof that the tradition was correct. To my surprise they took me to the clump of trees I had previously observed; and, as it is certainly quite distinct from any plant hitherto described from New Zealand, the tradition receives a certain amount of confirmation; and I need hardly point out that, if it were true—and we could hereafter determine the original habitat of this tree—it might give us a clue to the whereabouts of the mythical Hawaiki, or the place whence the Maori originally emigrated to New Zealand." The botanical description of this plant points to its close alliance to *Pomaderris apetala*, a native of Australia and Tasmania. Its specific name is accorded to it by the discoverer in honour of the great canoe, and as that by which it is known to the Maoris.

used by the Maoris as puncturing instruments in tatooing. The *Discaria* blooms in September in the North, and a month later in the South. The flowers are small, white, and sweet scented, and are produced in abundance along the under side of the branches. They are said to produce a very large quantity of honey, and are fertilized by insects. The seed vessel or capsule, when mature, becomes about the size of a peppercorn. The generic name of the plant is due to the disk of the flower being adnate, or united to the base of the calyx. The able compiler of the "*Handbook*" recognises this species as distinct from the Australian plant, relying on the absence of petals and the minute pubescence on the pedicels and flowers.

CHAPTER XIX.

ORDER XIX.—SAPINDACEÆ. The Soap Worts.

CHARACTER OF THE ORDER.—Trees, rarely shrubs. Leaves alternate, rarely opposite, simple or compound, exstipulate. Flowers regular or irregular, uni- or bi-sexual. Sepals, 3–5, imbricate or valvate. Petals, none, or 3–5, generally small, often with a scale on their inner face. Disk, none, or complete or incomplete. Stamens, 5–8, hypogynous, or inserted within the disk. Ovary, entire or lobed, usually 2–3-celled; style, simple; stigma, 2–3-lobed; ovules, 1–2 in each cell, fixed to its axis. Fruit, very various. Seeds usually exalbuminous, with large, solid or spirally-twisted cotyledons and incurved radicle.—*Handbook of the New Zealand Flora, p.* 44.

DESCRIPTION OF THE ORDER.—

VERY large and complicated order of tropical and temperate region plants, of which some genera present characters not noticed in the above description. There are above seventy genera, chiefly tropical, which are distributed into five tribes or sub-orders. The typical genus, *Sapindus*, is found in both hemispheres, mostly within the limits of the tropics, and consist of trees and shrubs, the fruits of which are fleshy externally, and do not open when ripe. Those of several species are acrid, and are called "soap-berries," from their being used in the tropics as a substitute for soap, their outer covering or shell containing a saponaceous principle (*saponine*) in sufficient abundance to produce a lather in water. Among the species thus used are :—*S. saponaria* and *S. inœqualis* in the New World, and *S. rarax* and *S. emarginatus* in the Old. Their excessively-hard, round, black seeds are used for making rosaries, necklaces, bracelets, buttons, etc., and a medicinal oil is extracted in India from those of *S. emarginatus*. The outer covering of the fruit of some species, such as *S. esculentus*, and *S. senegalensis*, is eatable, but their seeds are poisonous. The order in New Zealand consist of two genera, viz. :—(1). DODONÆA, leaves simple, disk none; and (2). ALECTRYON, leaves pinnate, disk 8-lobed.

GENUS I.

DODONŒA (*Linn.*) The Dodonœa.

Generic Character.—Shrubs or trees, often covered with a viscid exudation. Leaves simple (or pinnate), exstipulate. Flowers unisexual or polygamous, apetalous, regular. Sepals 3–5, imbricate or valvate. Male flower, Disk 0 Stamens 5–8 filaments very short; anthers linear-oblong, 4-angled. Female flower, Ovary sessile, 3–6 angled; cells 2-ovuled. Capsule membranous or coriaceous, septicidally 3–6 valved; valves broadly winged at the back. Cotyledons spiral.—*Handbook of the New Zealand Flora, p.* 44.

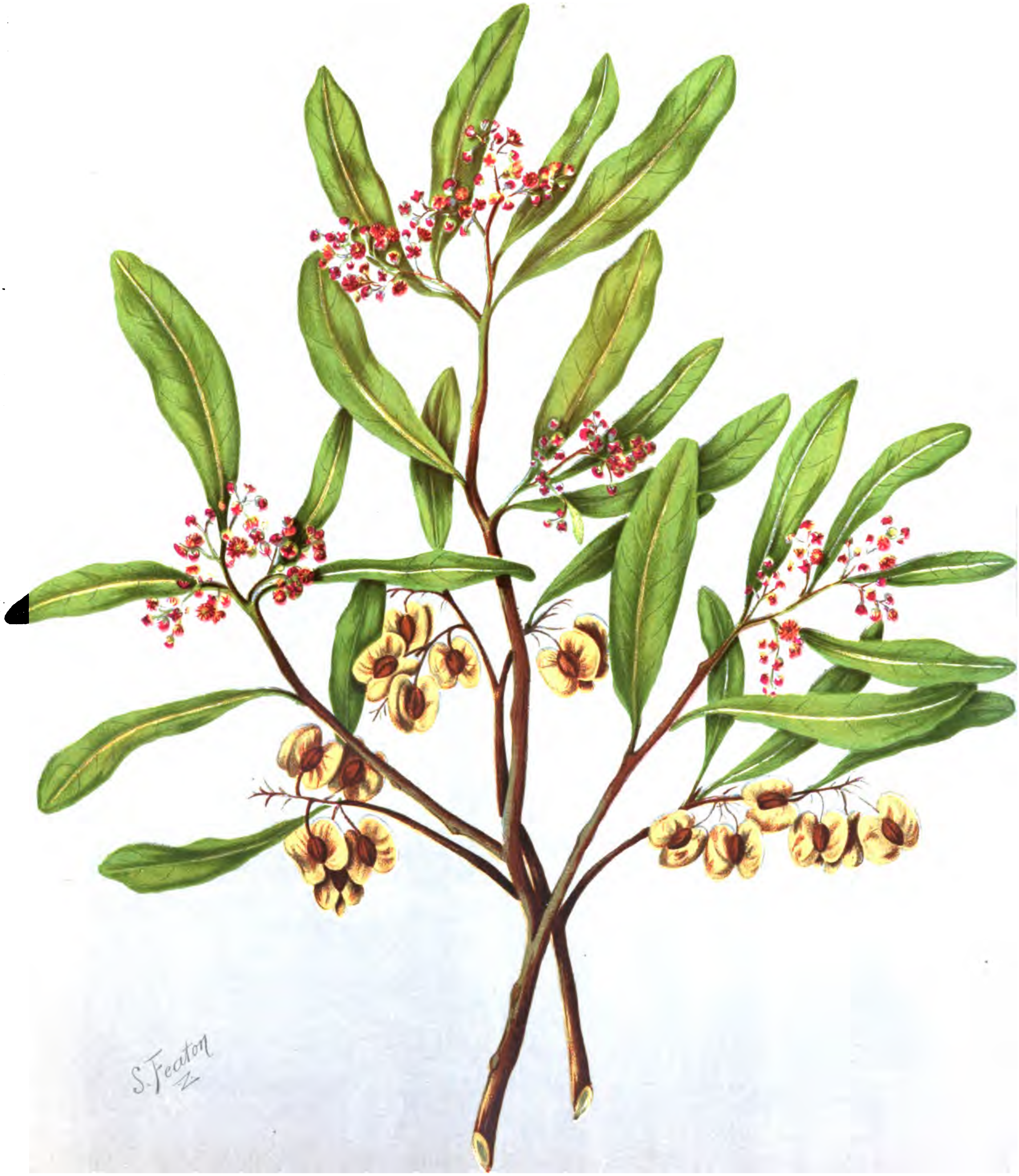
Description, etc.—A very large Australian genus, of which a very few species, including the New Zealand ones, are scattered widely over the warmer regions of the globe. Few of them exceed ten feet in height, and almost all have their leaves more or less covered with a clammy gum. The fruits are membranous, with their angles produced into their papery rounded wings. The leaves of *D. viscosa,* one of the most widely diffused species, have a somewhat sour and bitter taste, and the plant is from this circumstance called in Jamaica "Switch Sorrel." The leaves of *D. Thunbergiana,* a native of South Africa, are said to be used against fevers and as a purgative. The genus bears the name of Dodoœns, a Belgium botanist and physician of the sixteenth century. It is represented in New Zealand by *Dodonœa viscosa.*

1. DODONŒA VISCOSA (*Forst.*) The Viscid Dodonœa.

Specific Character.—A small glabrous tree, 6–12 ft. high, with very hard wood, variegated black and white, and compressed viscid young shoots. Leaves 2–3 in. long, on short petioles, linear-obovate, obtuse, acute, or retuse, quite entire, membranous, veined. Flowers small, in terminal, erect, few-flowered panicles. Sepals ovate, subacute. Anthers large, almost sessile. Fruit ⅓ in. long, orbicular, 2-lobed at both ends, on slender pedicels, 2–3-valved; valves with broad, oblong membranous veined wings. Seeds with dark red-brown testa.—*Handbook of the New Zealand Flora, p.* 45.

Description, etc.—Plate No. 22.—The "AKE-AKE."—This small tree is abundant in dry woods throughout the Islands. It sometimes attains a height of 30 feet, when it affords a dark, heavy timber of even compact grain, and has great durability. Generally the timber is variegated black and white, in the smaller growths. By the settlers it is sometimes called "Lignum Vitæ" on account of its density and weight, being the heaviest of New Zealand woods. The Ake-Ake blossoms in September, and bears small uni-sexual, or on some plants both male and female flowers. They have no petals, and to outward appearance are composed solely of a little bundle of short filaments or threads tipped with their rather large anthers. The fruit or seed-vessel is very peculiar, consisting of a flattened membranous capsule, the valves of which are broadly winged at the back. Our plate represents the plant with nearly matured fruit. In the early stages the valves and wings are green, but gradually become a pale brown as the fruit ripens. The wood is used by the Maoris in the manufacture of clubs, and other warlike implements. Owing to its extreme toughness and durability its name has passed into a

PLATE No. 22.



COPYRIGHT.

BOCK & COUSINS, CHROMO-LITHO.

AKE-AKE—Dodonœa viscosa.

proverb amongst the Natives, suggestive of lasting endurance, "Ake, Ake, Ake," signifying "for ever and ever." This species is likewise a native of Australia, the Pacific Islands, and the tropical regions of the Old and New World.

GENUS II.

ALECTRYON. (*Gærtner.*) The Alectryon.

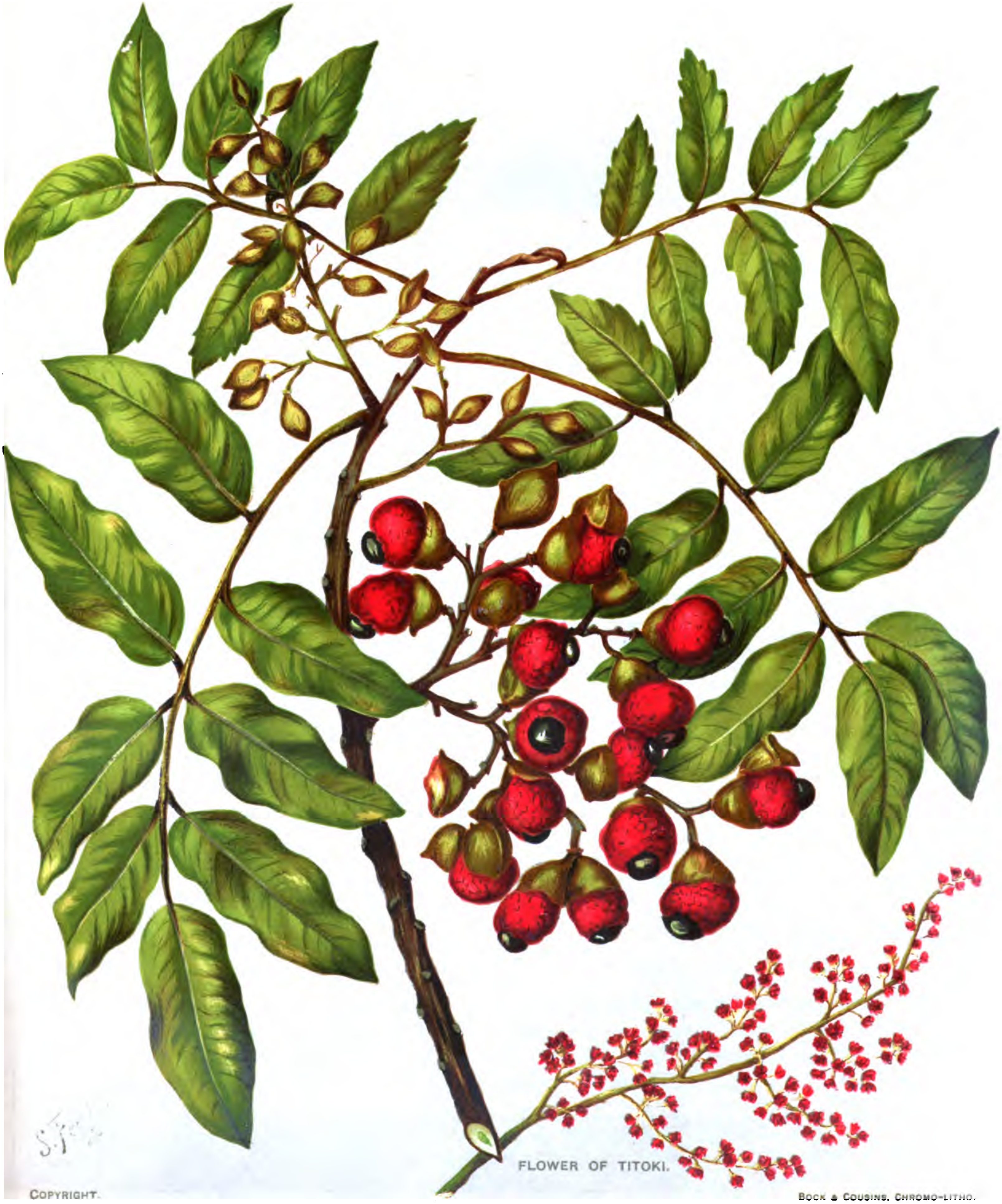
Generic Character.—A lofty tree, with tomentose branchlets. Leaves alternate, unequally pinnate, exstipulate. Panicles branched, axillary and terminal, many-flowered. Flowers small, almost regular, unisexual. Calyx 4 or 5-lobed; lobes villous within, rather unequal, imbricate. Petals 0. Disk small, 8-lobed. Stamens 5–8, inserted between the lobes of the disk. Anthers large, almost sessile. Ovary obliquely obcordate, compressed, one celled; style short, stigma simple or 2–3-fid; cell 1-ovuled. Fruit gibbous, pubescent, tumid or globose, with a compressed prominence on one side, rather woolly, indehiscent. Seed sub-globose, arillate; cotyledons spirally twisted.—*Handbook of the New Zealand Flora, p.* 45.

Description, etc.—This genus is confined to New Zealand, which has only one representative species (*Alectryon excelsum*), a very beautiful and valuable tree, resembling in foliage the English Ash.

1. ALECTRYON EXCELSUM. (*D.C.*) The Lofty Alectryon.

Specific Character.—Leaves 4-10 in. long; leaflets alternate, the young ones lobed and cut, serrate in young plants, petiolate, 2–3 in. long, obliquely ovate-lanceolate, acuminate, obscurely crenate, tomentose below, as are the petioles. Panicles 6–8 in. long, much branched, branches stout and spreading, densely tomentose, as are the flowers. Calyx pilose. Anthers deep red. Ovary hairy, hidden by the copious hairs at the base of the calyx. Capsule ⅓ in. long. Seed globose, in a large scarlet aril.—*Handbook of the New Zealand Flora, p. 45.*

Description, etc.—Plate No. 23. The "TITOKI," or "TITONGI." This very beautiful and valuable tree is indigenous to both Islands, but is most plentiful in the forests of the North Island. The trunk generally attains a height of fifty or sixty feet, and often measures three feet in diameter, but is usually smaller. It affords a fine-grained compact timber of great toughness and elasticity, similar to Ash, and is well adapted for the purposes of the machinist and the shipwright. It is very valuable for coach-building, and in the construction of wheels, but is not durable when exposed to the weather, unless protected by paint or varnish. It is, however, very suitable for the handles of carpenters' tools. The tree blossoms in September and October, when it is covered with large panicles of small dark crimson flowers. When the fruit matures in the succeeding month of January, the Titoki becomes brilliant with luscious looking crimson arils, tipped with their coal-black globular seeds, having somewhat the appearance of raspberries, seated in dainty nut-brown cups or capsules. The fruit is not pleasant to the taste, possessing a strong astringent flavour, but the native children eat it with a relish. Formerly the Maoris extracted an oil from the seeds, which was used for anointing the hair and persons of their chiefs. Every fourth year the Titoki is said by the natives to give a superabundance of fruit, so that, in that year every one could use the oil and a little red pigment, and thus for once look like a chief without being one, hence the saying, "Ko nga rangatira a te tau Titoki," "Chiefs of the Titoki year," (Colenso.) The fruit when ripe is eaten by the wild pigeon, the Tui, and other native birds. When the seeds fall they readily germinate, and young plants are generally plentiful beneath the parent tree. The Titoki is peculiar to New Zealand, and should, therefore, on that account be a tree of additional interest.


FLOWER OF TITOKI.

COPYRIGHT.

BOCK & COUSINS, CHROMO-LITHO.

TITOKI.—Alectryon excelsum.

CHAPTER XX.

ORDER XX.—ANACARDIACEÆ. The Anacards.

CHARACTER OF THE ORDER.—Trees. Leaves alternate, simple or compound, exstipulate. Flowers regular, usually small, unisexual or hermaphrodite. Calyx 3–7-fid or-partite. Petals 3–7 or none. Disk usually annular. Stamens as many as the petals, alternating with staminodia, or twice as many, inserted on or at the base of the disk. Filaments free; anthers versatile. Ovary free in the female flower; 1 or 2–5 celled. In the male often of 4 imperfect carpels. Styles 1–3. Ovule solitary, pendulous from a basal funicle, or from the wall, or top of the cell. Fruit superior, usually 1–5 celled; drupe with hard putamen. Seed, exalbuminous; cotyledons thick, fleshy; radicle, short.—*Handbook of the New Zealand Flora, p. 45.*

DESCRIPTION OF THE ORDER—

LARGE tropical order, rarer in temperate climates. When trees or bushes have a resinous, milky, often caustic juice, dotless leaves, and small inconspicuous flowers, with an ovary containing a single ovule suspended at the end of an erect cord, it is pretty certain that they belong to this order, of which more than 400 species are described. Among the products of the order are the Mango fruit and the Hog Plum of the West Indies; the nuts named Pistachios and Cashews, the Black Varnish of Burmah, and elsewhere—Mastic, Fustic, etc. These varnishes are extremely acrid, and produce dangerous consequences to persons who use them incautiously. The name of the order is derived from *Anacardium*, a genus of woody plants, which are chiefly remarkable for their kidney-shaped fruit, which is placed on the end of the thickened, fleshy, pear-like receptacle. The only New Zealand genus, *Corynocarpus*, is endemic, and allied to the Mango. In Australia the order is unknown.

GENUS I.

CORYNOCARPUS. (*Forst.*) The Corynocarpus.

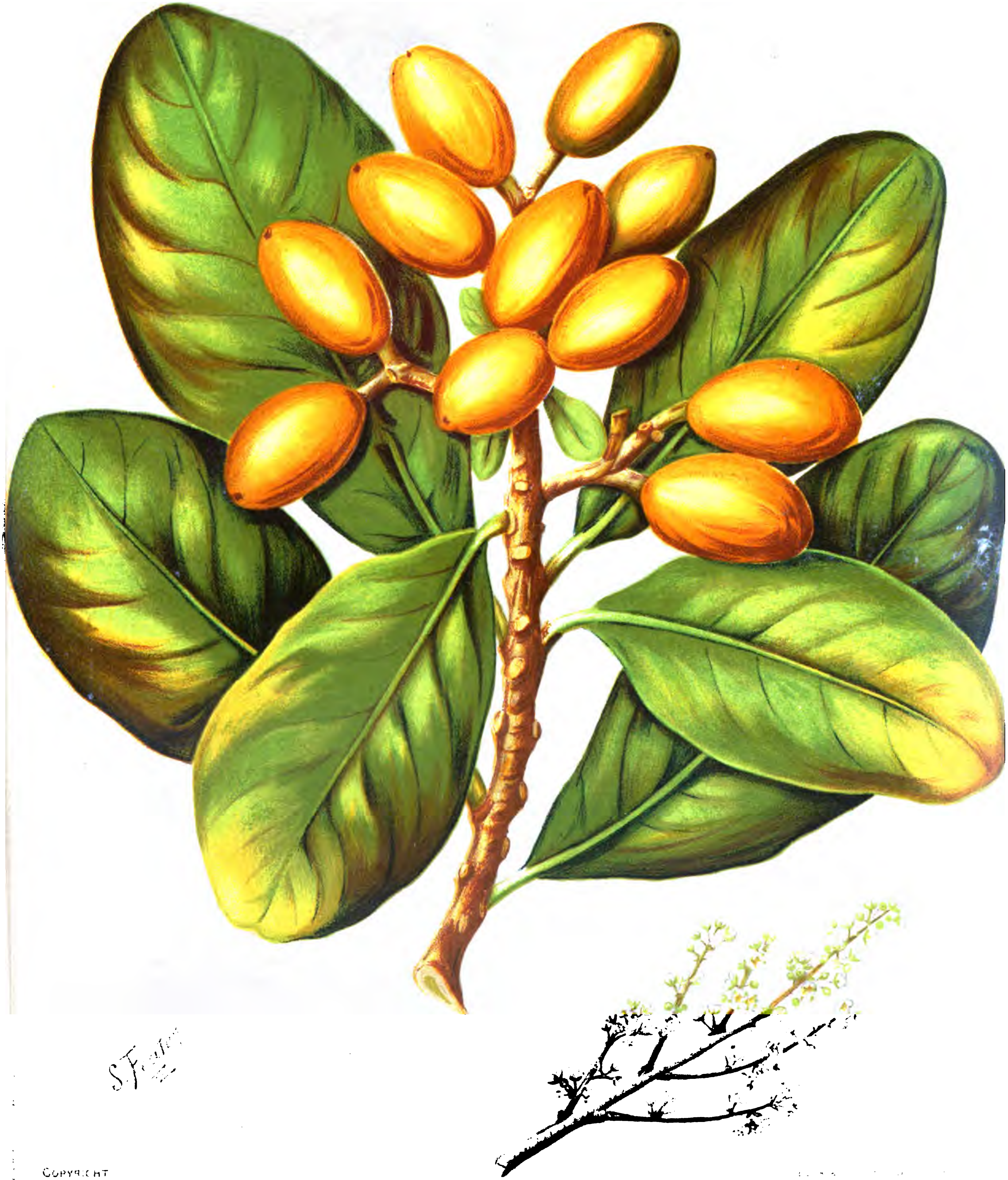
Generic Character.—A small, perfectly glabrous tree. Leaves, alternate, broad, bright-green, entire, coriaceous. Flowers in branched terminal panicles, small, green. Calyx, 5-lobed; lobes rounded, imbricate. Petals, 5; perigynous, rounded, concave, erect, imbricate, jagged. Disk, fleshy, 5-lobed. Stamens 5, inserted between the lobes of the disk, alternating with 5 petaloid, jagged scales. Ovary, sessile, ovoid, 1-celled, narrowed into an erect style, stigma capitate; ovule, pendulous below the top of the cell. Drupe, obovoid, fleshy; endocarp coriaceous and fibrous. Seed, pendulous; testa membranous, adherent to the cell; cotyledons, plano-convex, radicle minute.—*Handbook of the New Zealand Flora, p. 46.*

Description, etc.—A genus restricted to New Zealand, with only one species, *Corynocarpus lævigata*; said to derive its name from its club-shaped fruit, and smooth, laurel-like leaves. The tree is valued for its beauty by the settlers, and for its fruit by the Natives. The pulp of the drupe is eaten in its raw state, but the seed itself when partaken of, without certain preparation, is poisonous. The berry is called in Maori "Pakaraka." The tree is indigenous to the sea coast, but is found occasionally far inland, where it has been planted by the Natives. It occurs at Chatham Islands, and is said by Dr. Dieffenbach to be endemic. It has, likewise, been found on the Kermadec Islands, by the party who proceeded there to annex them to New Zealand, in August, 1887.

1. CORYNOCARPUS LÆVIGATA. (*Forst.*) The Smooth-leaved Corynocarpus.

Specific Character.—A leafy tree 40 ft. high. Leaves, 4–7 in. long, oblong, or lanceolate, sub-acute, shining, on short, stout petioles. Panicles, erect, thyrsoid, spreading, 4 in. long. Flowers, small, globose, ⅛ in. diameter, greenish white, inodorous, in short, stout pedicels. Petals, as long as the calyx-lobes, concave. Filaments, stout, subulate. Ovary, small, glabrous. Drupe, 1 in. long, oblong.—*Handbook of the New Zealand Flora, p. 46.*

Description, etc.—Plate No. 24.—The "KARAKA." This well-known and handsome tree is peculiar to the Northern Island. It is found abundantly near the sea-shore, where it forms groves, though it sometimes occurs inland, probably the result of propagation by the Maoris in former times, for food purposes. It is stated that a group of Karaka exist at Little Akaroa, in the Canterbury district, and two or three solitary trees occur at Collingwood, and at Karamea, in the Nelson district, in all instances undoubtedly the outcome of Native culture. The tree attains a height of from thirty to forty feet, and has a trunk from one to two feet in diameter. The wood is white, short-grained, and soft, splits well, but is not durable. The broad, glossy foliage, with its cool undershade, marks the Karaka as an object of interest to the weary traveller on a hot summer's day. Its wide-spreading branches offering a welcome retreat from the sun's rays. Horses and cattle are exceedingly fond of its foliage, and thrive well upon it. The tree blossoms in October, but its flowers are small, green, and inodorous. It is best seen to advantage in the month of February, when it is laden with tempting looking



COPYRIGHT

KARAKA—Corynocarpus lœvigata.

golden fruit, which affords a ready supply of nutritious food to the Wild Pigeon, and the Kaka. The fruit, or drupe, as it is technically called, is ordinarily about the size of a plum, and shaped like an egg, turning from a dark green into a rich golden colour as it ripens. The Natives in many parts, even to this day, gather it in large quantities, as an article of food, but in olden times it proved a staple article of subsistence, and on that account, as well as for its handsome appearance around their villages, the Karaka was held in much veneration by them.

> " . . . Umbrageous, cool, and green,
> Branches well-clothed, and golden fruit,
> Reflecting back the sun's most ardent sheen.
> A very tree of life and joy."

It was customary with the Maoris, when approaching, on important occasions, the graves of their ancestors, to adorn their heads with a chaplet of the leaves of this tree. The fleshy part, or covering of the kernel, is edible, but it has a sweet insipid flavour, which is much appreciated by the Maori, but is rather distasteful to the European. The raw kernels are poisonous, and when eaten in that state produce spasmodic pains, giddiness, and partial paralysis, to obviate which effects they are steamed for twenty-four hours, and then either buried in earth, or allowed to soak in running water for some days. The kernels thus prepared become quite innocuous, and remain sound for a length of time, in a dry store. The Karaka is in cultivation in the south of England, and is much admired as a handsome tree. It may be grown from cuttings, but is best and easiest raised from seed. It luxuriates in a rich damp soil. Seedlings should be planted out when they are about six inches high, and in cultivation are generally hardy. It is a very excellent addition to a garden, and being an evergreen, is always fresh and beautiful. The tree is not known to possess any useful medicinal properties, but this is amply compensated for by its fruit-producing character, and its great beauty.

CHAPTER XXI.

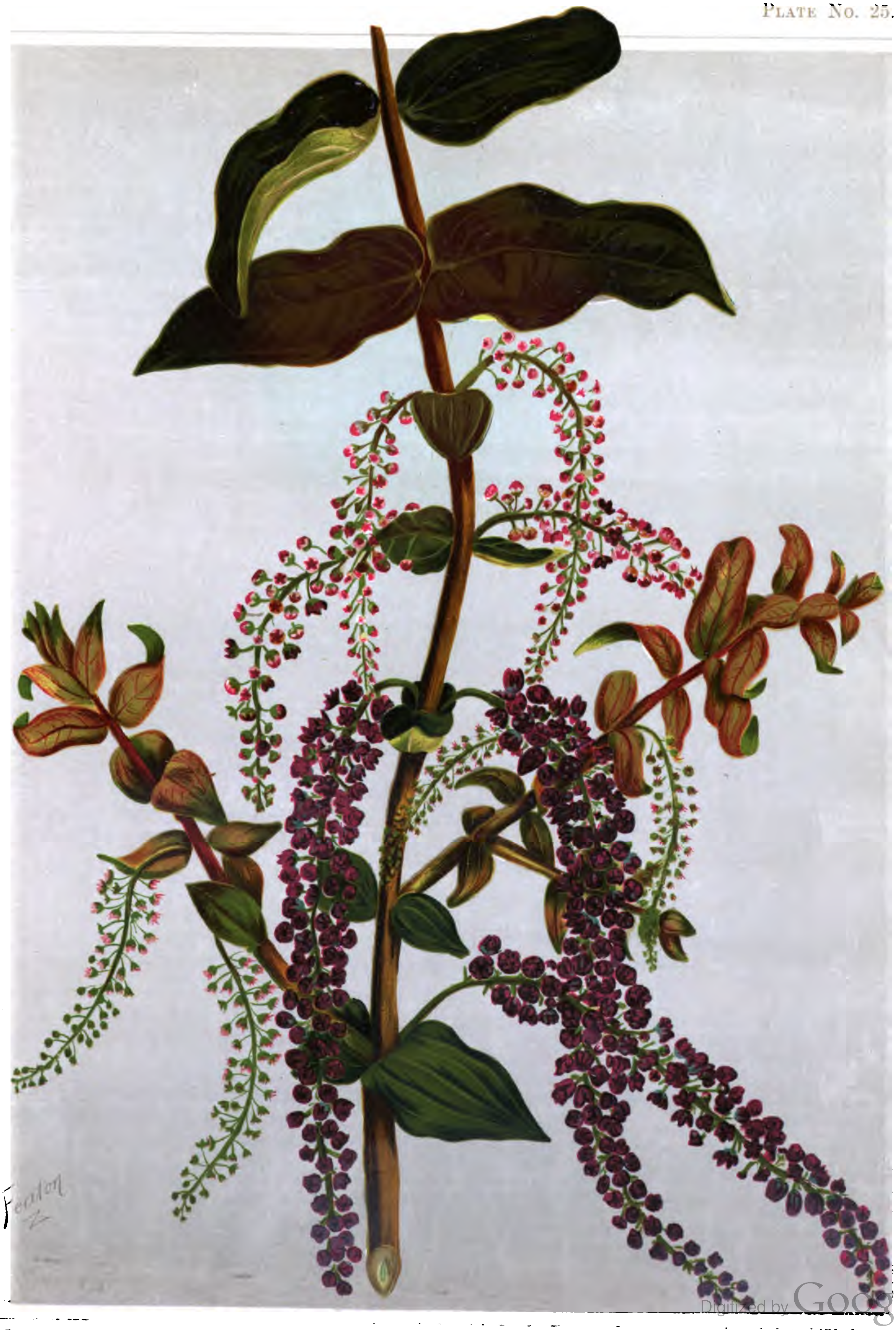
ORDER XXI.—CORIARIEŒ. The Hide-tanning Family.

CHARACTER OF THE ORDER.—Sarmentose, glabrous, leafy under shrubs, with angular branches. Leaves, opposite, or rarely 3-nate, exstipulate, entire. Flowers, hermaphrodite, solitary, or racemed, axillary, regular. Sepals, 5, triangular-ovate, imbricate, persistent. Petals, 5, hypogynous, triangular, shorter than the sepals; after flowering becoming fleshy and closely appressed to the carpels. Stamens, 10, hypogynous, all free, or 5 of them adnate to the petals; filaments short; anthers large, rough. Carpels, 5 or 10, whorled round, and adnate to a fleshy torus, 1-celled; styles, 5 or 10, free, flexuose, stigmatiferous all over; ovules, solitary, pendulous. Fruit, 5–8, small, indehiscent, compressed, oblong, crustaceous achenes, keeled on the back and sides, enclosed in the fleshy petals. Testa, membranous; albumen, thin; cotyledons, plano-convex; radicle, very short, superior.—*Handbook of the New Zealand Flora, p. 46.*

DESCRIPTION OF THE ORDER.—

SMALL order of shrubs and herbs; native of Southern Europe, the Himalayas, the South American Andes, New Zealand and the Kermadec Islands. The New Zealand species and their forms are all similar to those found in the South American Andes. The fruit of the European species, *Coriaria myrtifolia,* is poisonous, and is said to have proved fatal to some French soldiers in Catalonia. The leaves have also been used to adulterate Senna —a dangerous fraud, as they are stated to have caused tetanic convulsions, and subsequent coma. The seeds of the New Zealand species, *C. ruscifolia,* are poisonous if eaten, and the young succulent foliage is deleterious and often fatal to cattle if eaten in quantity. The name of the order is derived from the Latin word *corium,* a hide, relating to some of the species being used for tanning and dyeing leather.

PLATE No. 25.



COPYRIGHT.

TUPAKIHI.—Coriaria ruscifolia.

BOCK & COUSINS, CHROMO-LITHO.

GENUS I.

CORIARIA (*Linn.*) The Coriaria.

Generic Character.—Shrubs and herbs, with angular branches. Leaves opposite, or rarely 3-nate, exstipulate, entire. Flowers in racemes, hermaphrodite. Calyx, 5-parted, bell-shaped. Petals, 5, fleshy, with a prominent ridge internally. Stamens, 10, arising from beneath the ovary, which consists of 5–10 carpels arranged obliquely upon a thickened receptacle. Stigmas, 5. Ovules, solitary, pendulous, inverted. Fruit, of 5–8, small, crustaceous, indehiscent achenes, concealed by the membranous sepals and fleshy petals.—*Ed. Art Album New Zealand Flora.*

Description, etc.—A genus of shrubs and herbs, of rather uncertain position, made to constitute a distinct family, under the name of *Coriarieæ*. New Zealand is represented by three species, viz.:—(1.) C. RUSCIFOLIA, a perennial shrub with leaves one to three inches long; (2.) C. THYMIFOLIA, a small annual, with leaves ovate or lanceolate, from one-quarter to one inch long; and (3.) C. ANGUSTISSIMA, a herbaceous annual, with leaves narrow-linear, lanceolate, one-quarter-of-an-inch long.

1. CORIARIA RUSCIFOLIA (*Linn.*) The Ruscus-leaved Coriaria.

Specific Character.—A perennial shrub, 10–18 ft. high; trunk, 6–8 in. diam.; branches often long and flexuose. Leaves oblong, or obovate, acuminate or acute, 3-5-nerved, sessile or shortly-petioled. Racemes 8–12 in. long, drooping, many-flowered, pubescent; pedicles, $\frac{1}{3}$ in., slender, bracteolate at the base. Flowers, $\frac{1}{6}$–$\frac{1}{5}$ in. diam., green. Anthers, in some flowers, imperfect. Petals full of purple juice when the fruit is ripe.—*Handbook of the New Zealand Flora, p.* 46.

Description, etc.—Plate No. 25.—The "TUTU," or "TUPAKIHI."—This well-known shrub is abundant throughout both islands, and grows luxuriantly in rich soil, its presence amongst the indigenous vegetation indicating, by its growth, whether the quality of the land be good or otherwise. The general form of the plant is that of a bush, with long flexible branches growing directly from the root; but sometimes, though rarely, it assumes the form of a tree, with a trunk five or six feet in height, and from four to six inches in thickness, the branches extending from the crown of the trunk in a graceful drooping manner, producing a very pleasing effect, more especially when the tree is in fruit. Beneath the shade of such an one, the Authors have upon occasions screened themselves from the hot glare of the summer's sun. The flowering commences in September, when the long racemes are covered with small greenish red flowers, which grow very quickly, and ultimately in February and March, develope into the fully-ripened juicy fruit (the so-called fruit being nothing more or less than fleshy petals). The juice of these petals was formerly used by the Maoris as a beverage, and was considered rich and wholesome. In preparing it for use, it was carefully strained into calabashes, excluding the seeds, and kept for household consumption. Mixed with their fern-root, it was considered a very delicious accompaniment. A wine similar to elder-berry has been made from the juice by Europeans, and is much esteemed for its flavour and richness. The seeds are poisonous, the noxious principle being in an oil contained in them. The effects that result from eating the seeds are convulsions and delirium, which continues for several hours, and frequently terminates in death. If emetics are administered promptly, cases are not, however, fatal. In country districts, parents and others having control of children would do well to warn them of the danger of eating the seeds of the Tutu plant. The succulent young shoots are poisonous to cattle, more especially when eaten by the animals when hungry. The effects produced are a partial paralysis of the brain, which causes staggering and falling, with a seeming disposition to rush at objects, the eyes of the animal turning up in a distressing manner, whilst it sinks repeatedly upon its knees during the convulsion. Should the victim fall, speedy relief is afforded by making an incision in the ear, and allowing the blood to flow. Sometimes if this relief is not speedily forthcoming the beast succumbs to the poison. Should the animal attacked not fall, the virulence of the poison will pass off in a short time. Sheep introduced into a new district will often suffer from Tutu, the leaves of which they are exceedingly fond, but generally the attack is only slight, as they mostly nibble and walk on. When a sheep is overcome, it rushes on a few paces with its neck extended, then stops, staggers, and falls. Raising the head above the spine, and keeping it steady for a short time affords relief, and the attack passes away. It is generally asserted that horses will not eat the Tutu, but, on the other hand, it is likewise believed that they do, though sparingly, and then only in very hot weather, and in combination with other food which renders it innocuous. The Ground Tutu, *C. thymifolia*, of the Middle Island, is, however, said to be highly poisonous to horses. In any case the Tutu plant is best eradicated from enclosures where horses are kept, to prevent mischief occuring to them. A remarkable instance is on record of the death of an elephant in New Zealand, which was poisoned by eating Tutu. The incident is related by the late lamented scientist, Sir Julius Von Haast, and occurred some years ago to an elephant which was landed in Otago, and marched inland by its owner, for a considerable distance. Arriving at a suitable halting place, where the vegetation was abundant, the owner determined to give the animal a rest, and a few days feeding. The grass, which had been burnt off during the previous season, had shot up again with renewed vigour, and amongst it was a fine crop of succulent young plants of *Coriaria ruscifolia*. The elephant fed amongst the herbage for four hours, and afterwards went to a neighbouring stream, and drank freely. In turning back the animal began to reel, fell on the ground, and died after three hours; so that it took only seven hours from the time the beast began to feed until it died. It would seem from this incident that the poison must have been very virulent. The skeleton of this elephant may now be seen in the Museum at Wellington. The European plant, *C. myrtifolia*, is as poisonous as its New Zealand congener, *C. ruscifolia*, and produces convulsions, delirium, and death. The Maoris extracted a good blue-black dye from the bark of the Tutu, which they used effectively in colouring their mats and ornamental baskets. The root of the European species, *C. myrtifolia*, is used for tanning purposes. As cultivation spreads throughout the Islands, it is satisfactory to know that the *Coraria* is fast disappearing, though to eradicate it effectually it must be turned up by the roots, which when dry should be burnt off. Simply cutting the plant down will do no good, as it springs up again with increased vigour.

2. CORIARIA THYMIFOLIA (*Humb.*) The Thyme-leaved Coriaria.

Specific Character. — A much smaller annual (?), usually more pubescent plant than *C. ruscifolia*, sometimes only a foot or so high, with small, ovate-lanceolate leaves, shorter racemes and smaller flowers; large forms of it, however, seem to be connected with smaller ones of the former, both in New Zealand and America.—*Handbook of the New Zealand Flora, p.* 46.

Description, etc.—This plant is common in various places throughout the Islands, ascending to 5,000 feet. It is likewise a native of the Kermadec Islands, and South America, where it ranges from Mexico to Peru, at elevations of from 4,000 to 12,000 feet. In Otago it is commonly known as the Small Ground Tutu, and is said to be highly poisonous to horses. It derives its specific name from the small Thyme-like appearance of its foliage.

3. CORIARIA ANGUSTISSIMA (*Hook., F.*) The Very Narrow-leaved Coriaria.

Specific Character. — A small, bright-green annual species, 6–18 in. high, with the habit of *C. thymifolia*; but the branches are glabrous, very slender, more dense, and the leaves are very narrow, linear-lanceolate, or subulate; ¼ in. long.—*Handbook of the New Zealand Flora, p.* 47.

Description.—This small species is found on Mount Egmont, and on the top of the Ruahine Mountains, in the Northern Island; and is abundant in sub-alpine localities from Nelson to Otago. The Editor of the "*Handbook*" says that this plant, in his opinion, passes into *C. thymifolia*, but that all his New Zealand correspondents regard it as a distinct species. It is known in Otago as the Annual Herbaceous Tutu, and may be regarded as poisonous, favouring as it does *C. thymifolia* in habit, anyhow, it should always be looked upon with suspicion, as belonging to a family of bad repute.

CHAPTER XXII.

ORDER XXII.—LEGUMINOSÆ. (Tribe *Papilionaceæ*.) The Pea and Bean Family.

CHARACTER OF THE ORDER.—Herbs, shrubs, or trees. Leaves alternate (rarely opposite), stipulate, mostly compound; leaflets usually entire. Flowers irregular, hermaphrodite. Calyx, 5-toothed, or cleft, or 4-toothed by the union of the upper lobes. Corolla, papilionaceous, *i.e.* of 5 petals, the upper (standard) broadest, outside in bud often reflexed; the two next lateral (wings), vertical, and parallel; the two lowest also vertical and parallel within the wings (forming the keel), often combined by their lower edges. Stamens, 10, 9 usually united into a membranous tube sheathing the ovary, the upper free, rarely all free. Ovary, sessile, or stipitate, generally long, flattened, 1-celled, tapering into a straight, or upturned style; stigma, small, simple, lateral, or capitate. Fruit, a 1 or more seeded legume, splitting into 2 valves in all the New Zealand genera, except *Carmichelia*. Seeds, exalbuminous; cotyledons, thick, plano-convex; radicle, short.—*Handbook of the New Zealand Flora, p. 47.*

DESCRIPTION OF THE ORDER.—

THIS order is a very large one, and the plants occur in all parts of the world, but are abundant in tropical countries. It forms, in Australia, a great proportion of the indigenous vegetation—herbaceous, shrubby and arboreous,—but is less developed in New Zealand than in any other part of the world. It has been divided into three sub-orders, viz.:—(1.) *Papilionaceæ;* (2.) *Cœsalpinieæ* and *Mimoseæ.* The first-named sub-order is alone peculiar to New Zealand. Some of the plants of the order are nutritious, others tonic and astringent, others purgative, and a few poisonous. They supply timber, fibres, gums, dyes, and various economical substances. Amongst the useful plants may be noted peas, beans, lentils, kidney-beans, and pulse of various kinds—lupins, clover, lucerne, medick, sanfoil, liquorice, tragacanth, indigo, and kino. Amongst the poisonous plants are *Coronilla varia, Cytisus laburnum, Gompholobium uncinatum,* and *Physostigma venenosum,* the Ordeal beans of Calabar. There are about 550 genera and 7,000 species. The New Zealand species consist of:—(1.) CARMICHŒLIA, shrubs, leafless, or leaflets in 1 to 3 pairs—flowers small; (2.)

Notospartium, free, with pendulous, chord-like branchlets, leafless—flowers pink; (3.) **Swainsonia**, a herb, with leaflets in several pairs—flowers purple; (4.) **Clianthus**, herbaceous undershrub, leaflets in many pairs—flowers large, scarlet; (5.) **Sophora**, shrubs or trees, leaflets in many pairs—flowers large, yellow.

GENUS I.

CARMICHÆLIA. (*Brown.*) The Carmichelias, or Native Brooms.

Generic Character.—Shrubs or small trees, usually quite leafless, or leafy in a young state only; branches terete, or more often flattened, grooved, or striate, green. Leaflets, in 1-3 pairs, obcordate. Flowers, small, pink, bluish, or white, in small lateral fascicles or racemes, inserted in notches on the edges of the branchlets. Calyx, short, cup-shaped, or companulate, truncate, 5-toothed. Standard orbicular, usually reflexed. Wings more or less falcate, obtuse, auricled at the base. Keel, oblong, incurved, obtuse. Upper stamen more or less free from the others. Ovary, narrowed into a slender curved style, beardless, stigmatiferous at the very tip; ovules, numerous, 2-seriate. Pod, small, oblong, or orbicular, straight or oblique, with a short or long rigid subulate beak, thick, very coriaceous; valves opening at the tip only, or with the centre falling away from the persistent consolidated edges. Seeds, 1–3, oblong or reniform; funicle not thickened, radicle with a double flexure.—*Handbook of New Zealand Flora, p. 48.*

Description, etc.—A most singular genus of shrubs, confined to New Zealand. The branches are sometimes round, but more commonly flattened and tape-like. Some of the plants, when in a seedling condition, are furnished with unequally pinnate leaves; but after they are a few weeks old, no more leaves are produced. The flowers are small, very numerous, white, pink, lilac, or yellow in colour, and disposed in short racemes. The pods are roundish, slightly turgid, about half-an-inch long, and contain two or four seeds. They are remarkable in the family on account of a thin partition (replum) between the valves of the pod, which remains after the valves have fallen; to this partition the seeds are attached. The genus is named in honour of Captain Carmichael, a botanist of repute, who published an account of the plants of the Island Tristan d'Acunha. The genus is represented by over twelve species, and most probably there may be others. The family is very difficult to discriminate, and many intermediates are known to exist. Those at present known are:—(1.) C. **crassicaulis**; (2.) C. **Munroi**; (3.) C. **nana**; (4.) C. **grandiflora**; (5.) C. **pilosa**; (6.) C. **Australis**; (7.) C. **odorata**; (8). C. **flagelliformis**; (9.) C. **juncea**; (10.) C. **enysii**; (11.) C. **uniflora**; (12.) C. **Williamsii**; (13.) C. **Kirkii.**

1. CARMICHÆLIA CRASSICAULIS. (*Hook, F.*) The Thick-stemmed Carmichelia.

Specific Character.—Branchlets very robust, cylindric, ⅓ in. diameter, with many deep, parallel, tomentose grooves. Leaves not seen. Flowers in rounded fascicles of 6–12, ¼–⅓ in. long, shortly pedicelled. Calyx and pedicels densely woolly, lobes of the former ovate, obtuse; bracteoles at its base minute. Standard, large, reflexed. Ovary densely villous, with white silky hairs. Pod, unknown.—*Handbook of the New Zealand Flora, p. 48.*

Description.—This plant is an Alpine, and indigenous to the Middle Island. It is found on the Mount Torlesse Range, in the Canterbury district, at an elevation of from

3,000 to 5,000 feet, and in old moraines around Lake Ohau. It is likewise known on the Hawkdun and Mount Ida Ranges, in Otago. This very fine species is at once recognised by its stout, and deeply-grooved branches, and its large flowers, collected into a compact head, with woolly calyx, and large lobes. Its name is due to the robust character of its branchlets.

OTHER SPECIES OF CARMICHÆLIA.

C. MUNROI. (*Hook, F.*)

Branchlets stout, slightly, or much compressed, $\frac{1}{8}$ in. diameter, striated, not grooved, quite glabrous. Flowers $\frac{1}{4}$ to $\frac{1}{3}$ in. long, in few lax-flowered racemes. Pedicels very slender. Found half-way up the summit of Macrae's Run. The very stout habit, and lax, large-flowered racemes, best distinguish this plant. It is named in honour of the late Sir D. Munro, a botanist of standing, who has added many beautiful Alpine species to the New Zealand Flora.

3. C. NANA. (*Col.*)

A very dwarf, glabrous, rigid shrub, two to four feet high, with fascicled leaflets, much compressed, minutely striated (streaked), erect branchlets $\frac{1}{12}$ to $\frac{1}{8}$ in. diam. Flowers $\frac{1}{4}$ to $\frac{1}{3}$ in. long. Calyx shorter than the slender pedicels, glabrous, or sparsely pilose, lobes rather large, and obtuse; bracteoles at the base, minute. Standard about as long as the wings. Ovary quite glabrous. Pod linear-oblong, $\frac{1}{8}$ to $\frac{1}{2}$ in. long, with a short straight beak, like the pod of *C. Australis*. It is indigenous to the Northern Island, in the dry mountainous country at the base of Mount Tongariro, and in the Middle Island on the Southern Alps. It is likewise a common plant on the Hawkdun and Mount Ida Ranges, in Otago, and occurs in the Upper Motueka Valley, Nelson.

4. C. GRANDIFLORA. (*Hook, F.*)

A much-branched glabrous shrub, with branchlets round, or compressed, $\frac{1}{12}$ to $\frac{1}{6}$ in. broad, deeply grooved, often leafy. Its flowers are $\frac{1}{4}$ in. diam. long, in peduncled, lax, broad, obtuse, 6 to 8 flowered, glabrous racemes, on slender pedicles half as long as the calyx. The standard is much larger than the wings. Pods in nodding racemes, narrow, oblong, $\frac{1}{4}$ in. long, gradually narrowed into a subulate beak, $\frac{1}{8}$ in. long. It has two pale brown seeds. The plant is indigenous to the Middle Island, at Milford Sound, the river-beds of the Southern Alps, at an altitude of from 2,500 to 4,500 feet, and in the Otago

Lake District. It is a very distinct species, best known by the large flowers from which it derives its specific name, deeply-grooved branches, and 3-foliolate leaves. The flowers are said to be odoriferous.

5. C. PILOSA. (*Col.*)

A much distichously branched shrub, with branchlets notched alternately on either side, much compressed, $\frac{1}{12}$ to $\frac{1}{8}$ in. broad, fluxuose, deeply grooved. The flowers are minute, in small erect, dense, 10 to 15 flowered racemes. Standard much larger than the up-turned wings. Pods small, in pendulous racemes $\frac{1}{4}$ in. long. It bears its name from the silky-pubescent character of its branchlets, and its silky ovary. This species is known only on the East Coast of the Northern Island. It is peculiar in having the ground branchlets of *C. grandiflora*, and others, and the racemes of *C. odorata*, but the silky ovary distinguishes it from these and all its congeners except *C. crassicaulis*.

6. C. AUSTRALIS. (*Brown.*)

An erect, much-branched shrub, or small tree, with straight, quite flat, elongated branchlets, $\frac{1}{14}$ to $\frac{1}{4}$ in. broad, finely striated, with distinct alternate notches. Leaflets one or two pairs, broadly or narrowly obovate-cordate, or obcuneate, quite glabrous. Flowers small, $\frac{1}{8}$ in. long, in small 5 to 8 flowered, erect or spreading racemes. Standard broad, longer than the wings. This may be considered the typical species of the genus, and is common along the Eastern Coasts, and in the interior of the Northern Island, but does not occur within many miles of Wellington. It is recorded as being indigenous to the Middle Island, but the statement requires confirmation. The plant may easily be distinguished by its red seeds. It is called "Whakaka" by the Maoris.

7. CARMICHÆLIA ODORATA (*Col.*) The Scented Carmichælia.

Specific Character.—A much-branched shrub; branches distichous, terete, compressed or plano-convex, $\frac{1}{12}$–$\frac{1}{10}$ in. broad, deeply grooved, pubescent towards the tips. Leaves, small, silky-pubescent on both sides; leaflets in two pairs, very small, $\frac{1}{6}$–$\frac{1}{8}$ in. long, narrow oblong, obcuneate, 2-lobed at the tip. Flowers, minute, $\frac{1}{10}$–$\frac{1}{8}$ in. long, in numerous, small, erect, many-flowered, pubescent racemes, very shortly pedicelled; bracteoles, minute, on the pedicel. Calyx-teeth rather long, acute. Pods in pendulous racemes, exactly like those of *C. pilosa*.—*Handbook of the New Zealand Flora, p.* 50.

Description.—Fig. 1, Plate No. 26—The "SCENTED-BROOM."—This beautiful species is indigenous to both Islands, being found on the East Coast of the Northern, and in the Nelson, Otago, and Canterbury districts of the Middle Island. It is very similar to *C. pilosa*, but differs from it in having a glabrous ovary. In habit this species varies to a surprising degree, but is remarkably constant in the structure of the flowers and fruit. Sometimes the branches are prostrate, bearing a close resemblance to *C. juncea*, at others, erect or spreading; leafless and foliaceous specimens may be found growing side by side. The branches may be round and extremely slender, or excessively flattened, and broad, while the inflorescence may vary from a few scattered fascicles, to dense whorls, or many-flowered racemes, and not infrequently all the variations may be found in the same plant. The subject of our plate is a remarkably pretty foliaceous variety, with racemes of many parti-coloured flowers. The shrub is much prized in cultivation for its form, and the prodigal display of its flowers. In the North Island it blossoms in December, and matures its fruit about March, the pods containing two or three small seeds. It owes its name to the supposition that its flowers possess an odour, but the report is perhaps not reliable. If they do exhale a perfume it is but faintly.

8. CARMICHÆLIA FLAGELLIFORMIS (*Col.*) The Whip-like Carmichælia.

SPECIFIC CHARACTER.—A much-branched shrub, with almost fastigiate, numerous, very slender, compressed, rarely plano-convex grooved branchlets, $\frac{1}{16}$–$\frac{1}{10}$ in. broad. Leaves not seen. Flowers, minute, $\frac{1}{10}$–$\frac{1}{8}$ in. long, in pubescent, lax, 3–6-flowered fascicles, or open racemes; pedicels very slender; bracteoles above the middle, or below the calyx. Pods, oblong or obliquely orbicular, about $\frac{1}{3}$ in. long, with a stout, subulate, straight beak $\frac{1}{12}$ in. long. Seeds, mottled with yellow or red, brown or black.—*Handbook of the New Zealand Flora, p.* 50.

DESCRIPTION, etc., Fig. 2, Plate No. 26.—The "NATIVE BROOM."—This species, which is well known by its long whip-like branches, is found along the East Coast of the Northern, and in many parts of the Middle, Island, from Nelson down to Otago. It is the most common species in Southland. On Banks Peninsula, the branchlets are sometimes thread-like and pendulous, presenting a very elegant appearance; but in this state the flowers are produced sparingly. The leaves, which are not described by the editor of the "*Handbook*," in his description of the plant, have since been determined by Professor Kirk, F.L.S., who states that they are 3–5-foliolate, with leaflets emarginate. The plant blossoms in the North Island in October and November, and the seed reaches maturity in February, when the valves become separated from the replum, and display the seed attached to its membranous attachment. Our plate clearly indicates the presence of the seed thus supported. The "Kakapo," or "Ground-parrot" of the South Island, delights to chew the Broom into a ball, to extract the juice; by this, the Natives know the haunts of the bird. The European Broom, *Planta genista*, allied to our Carmichælias, is accepted as the emblem of humility, and has given its name to a race of English kings. It was assumed by Geoffrey, Earl of Anjou, the father of the first Plantagenet king—Henry the Second—as a floral badge. According to tradition, the Earl, when encamped on a heath just before a battle, plucked a golden spray, and placed it in his helmet. The flower gleamed everywhere, amid the swaying storm of battle, and the triumphant victor adopted his chance badge as his future device.

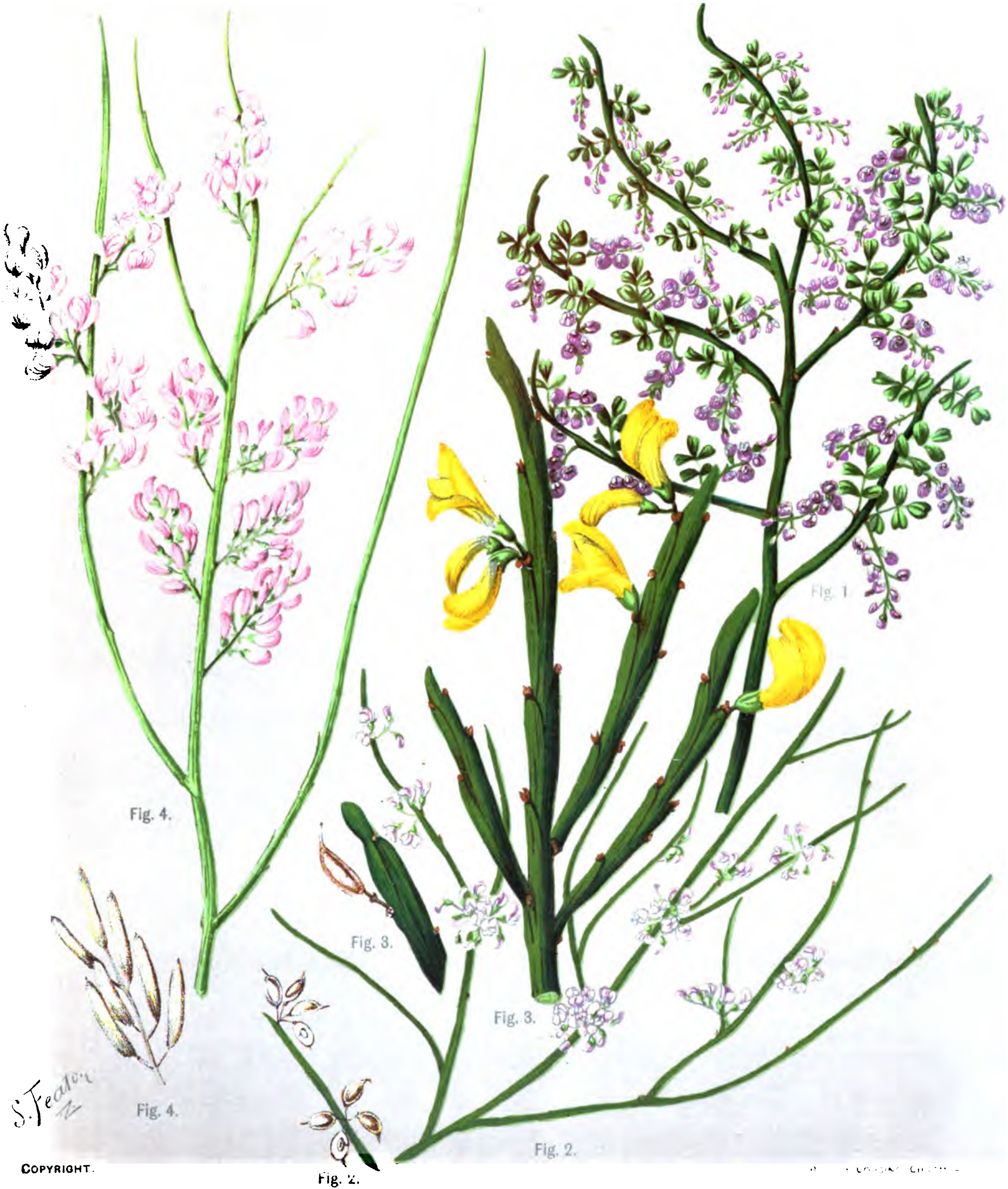


Fig. 4.
Fig. 1
Fig. 3.
Fig. 3.
Fig. 4.
Fig. 2.
Fig. 2.
S. Featon

COPYRIGHT.

1.—CARMICHÆLIA ODORATA. 2.—C. FLAGELLIFORMIS and Fruit. 3.—C. WILLIAMSII and Fruit
4.—NOTOSPARTIUM CARMICHÆLIA and Fruit.

9. C. JUNCEA (*Col.*)

A small, slender shrub, a foot or less high, with very slender, compressed, often curved, grooved branches and branchlets, less than $\frac{1}{12}$ in. broad. The leaves are described by Professor Kirk, F.L.S., as unifoliate, or pinnately 3–5-foliate, silky, terminal leaflet much the longest; leaflets, ovate or linear, long, sometimes produced in profusion at the base of the branches, which are closely appressed to the ground and excessively compressed. It is due to us here to remark that much and valuable information on the genus *Carmichælia* has been given by Professor Kirk, in an able article which appeared in Vol. XVI., "*Transactions and Proceedings of the New Zealand Institute,*" 1883, and from which we have made copious notes; more particularly as many important characteristics of these plants are absent in the "*Handbook,*" and remained undescribed until Professor Kirk's remarks were published. The flowers are minute, $\frac{1}{10}$ to $\frac{1}{8}$ in. long, in loose, small 4–8-flowered fascicles; calyx small, rather membranous; lobes small, and rather acute. Pod very minute. This species is found in the Northern Island, at the East Cape, in Hawke's Bay, and at Taupo. In the Middle Island, it is reported likewise from Akaroa, and on the Canterbury Plains.

10. C. ENYSII (*Enys and Kirk.*)

This plant forms dense, hard patches one to four inches in diameter, and scarcely exceeding one inch above the surface of the ground. The root and lower branches are stout; secondary branches one inch long, with small compressed branchlets. The leaves are small, orbicular in form and emarginate, on slender petioles. The flowers have not been described, but must be very minute. The seed-pods are solitary, $\frac{3}{10}$ in. long, and each contains one small black seed. This species is said to be one of the most remarkable plants in the Flora; the branches are so dense that it is impossible to thrust the finger between them. It is local and very rare, not more than a dozen plants having been found at present. The plant was discovered by Messrs. J. D. Enys and T. Kirk, on the terraces of the Porter River, Waimakariri, in the Canterbury District.

11. C. UNIFLORA (*T. Kirk*).

A small straggling plant, with creeping stems, and slender, distant branches, allied to *C. nana*. Leaves not seen. Flowers solitary, $\frac{1}{4}$ in. long. It is a native of the Middle Island, and was found by J. D. Enys at Lochnavar, and in the Valley of the Poulter.

12. CARMICHÆLIA WILLIAMSII (*T. Kirk*). Archdeacon W. L. Williams' Carmichælia.

Specific Character. — A leafless shrub. Branches excessively compressed, ⅜–⅝ in. broad, thin, with numerous parallel grooves, minutely pubescent when young, hoary or silky; notches alternate, distant. Leaves, unknown. Flowers, sparingly produced, solitary, or 2–3-flowered; fascicles, very large, with the pedicels fully 1 in. long; pedicels, slender, silky. Calyx, large, 5-toothed, acute, pubescent; corolla, sharply curved upwards; petals, acute; stamens, diadelphous; ovary, shortly stipitate, glabrous; style, long, curved; stigma, capitate. Pods, on stout erect pedicels, slightly turgid, oblong or obliquely oblong, with a long straight beak 1–1¼ in., including beak. Seeds, 9–10, red, mottled with black. — *Transactions and Proceedings of the New Zealand Institute, Vols. XII. and XVI., Pp.* 394, 380. *T. Kirk.*

Description, etc., Fig. 3, Plate No. 26.—"ARCHDEACON W. L. WILLIAMS' CARMICHÆLIA."—This fine species, in all respects the largest of the genus, is allied to *C. nana* in the structure of its flowers, but entirely lacks the rigidity of that species. The branches are slender for so large a plant; the notches are more distant than in any other species, and in the young state carry a single triangular scale as in *C. nana*; but in old branches the single scale is replaced by an aggregated mass of shorter scales, sometimes attaining the size of a small pea. The flowers are large and of a pale yellow colour. This contribution to our Flora was made by Archdeacon W. L. Williams, of Gisborne, to whom botanical science owes much for this and many other rare specimens with which he has from time to time enriched the stores of knowledge. We are much indebted to this gentleman for a specimen of the fine plant which adorns our pages. The species was named in honour of the discoverer. It is known only as growing in the Northern Island, at Raukokore Bay, the southern end of the Bay of Plenty, and at Hicks Bay, near the East Cape.

OTHER SPECIES OF CARMICHÆLIA.

13. C. KIRKII (*Hook., F.*)

This extremely slender plant is a native of the Middle Island in Cardrona Valley, and at Otepopo. It is a very distinct species, differing from all others in habit, flowers and fruit. The long flexuose branches are unable to support their own weight, and usually become interlaced with adjacent shrubs. Its branches are few, distant, extremely slender, two to three inches long, round and grooved. Leaves few, pinnately 3–5-foliate. The flowers are half an inch long, on lax racemes, 3–5-flowered. It has a pod half an inch in length, and a stout broad replum. Named in honour of Professor T. Kirk, F.L.S., whose labours in botanical science are too well known to need commendation at our hands, to enhance their value.

GENUS II.

NOTOSPARTIUM. (*Hook, F.*) The Notospartium:

Generic Character.—A shrub or small tree, with slender branches, and pendulous branchlets, like whipcord. Leaves, not seen. Flowers, rather small. Calyx, companulate, truncate; teeth, 5, short. Standard, obovate-obcordate, not auricled at the base. Wings, oblong, with an incurved auricle at the base, shorter than the hatchet-shaped keel. Stamens, diadelphous. Ovary, nearly sessile, linear, tapering into a curved style, which is ciliated. Pod, shortly stipitate, linear, elongate, with a slender style, curved, torulose, compressed, membranous, indehiscent, many-jointed, many-seeded. Seeds, solitary in the cells, oblong, with a doubly-bent and twisted club-shaped radicle.—*Handbook of the New Zealand Flora, p. 51.*

Description, etc.—A most curious genus peculiar to New Zealand, and allied in habit, and in many other respects to *Carmichælia*, but widely differing from it, and from all other known genera.

1. NOTOSPARTIUM CARMICHÆLIA. (*Hook, F.*) The Carmichælia-like Notospartium.

Specific Character.—A small tree, with weeping branches, and pink flowers. Branchlets, 1 ft. or more long, compressed, grooved, $\frac{1}{20}$ in. broad, remotely toothed, giving off at the teeth many-flowered racemes, 1–1½ in. long. Peduncle and short pedicels, pubescent. Flowers, ¼–⅓ in. long. Pods, 1 in. long, $\frac{1}{12}$ in. broad.—*Handbook of the New Zealand Flora, p. 51.*

Description, etc.—Fig. 4, Plate No. 26.—The "NOTOSPARTIUM," or "PINK BROOM." This beautiful tree is indigenous to the Middle Island, and confined to the northern part of the Canterbury District, the Kaikoura Ranges, and the Upper Awatere. ascending to a height of 1,500 feet. It blossoms in December, when it is a charming spectacle, having its long weeping branches adorned with the beautiful pink pea-flowers, plentifully displayed. The plant, even in its native habitat, does not appear to be common.

GENUS. III.

SWAINSONIA. (*Salisbury.*) The Swainsonia.

Generic Character.—Herbs; stems prostrate, erect, or climbing, sometimes woody at the base. Leaves, unequally-pinnate, stipulate; leaflets, many. Flowers in axillary, peduncled, racemes. Calyx, companulate, 5-toothed. Standard, broad, open or reflexed, orbicular. Wings, narrow, auricled at the base, as long as, or shorter than the obtuse keel. Style. slender, bearded on the upper or inner edge; ovules, many, Pod, ovate oblong, or terete, inflated, or turgid, acute. Seeds, rather small.—*Handbook of the New Zealand Flora, p. 51.*

Description, etc.—A large Australian genus comprising herbs, or undershrubs, with flowers in axillary racemes, either purple, blue, red, or white. Some of the species, as *S. Greyana*, *S. procumbens*, as also *S. violacea* and *S. galegifolia*, are very handsome plants. The genus is represented in other parts of the world by *Astragalus*, the Milk Vetch, from which it is chiefly distinguished by the broader, and more expanded standard. New Zealand is represented by only one species—*Swainsonia Novœ Zelandiœ*, a small, sparingly-branched herb, with purple flowers.

1. SWAINSONIA NOVÆ ZELANDIÆ. (*Hook, F.*) The New Zealand Swainsonia.

SPECIFIC CHARACTER.—A small, low, sparingly-branched herb, covered with minute silky pubescence; branches, 2–4 in. long. Leaves, 1–2 in. long; leaflets, opposite, ¼ in. long, sessile, obovate-oblong, obtuse or retuse; stipules, ovate, obtuse. Peduncle, 1 in. long, bearing 5–8 racemed flowers. Flowers, purple, ⅓ in. long; pedicels, rather shorter than the calyx, bracteate at the base. Calyx, with rather long teeth, villous within, and on the edges, 2-bracteolate. Standard, without callosities; keel and wings nearly equal, straight. Pod, large, nearly 1 in. long, ¼ in. broad, acute at both ends, puberulous; valves, thin, coriaceous. Seeds small.—*Handbook of the New Zealand Flora, p. 51.*

DESCRIPTION, etc.—This species is peculiar to the Middle Island, in the Canterbury district, about the sources of the Kowai River, and in the Hurunui Valley. It may be said to be almost Alpine in habit, being found in the shingly river-beds, at an altitude of from 2,000 to 2,500 feet. It is very closely allied to the Tasmanian *S. lessertiæfolia*, which is a larger plant, with many-flowered racemes, the inflorescence of which is slightly different, having more obtuse, shorter, calyx-like teeth, and a more curved keel.

GENUS IV.

CLIANTHUS. (*Solander.*) The Clianthus.

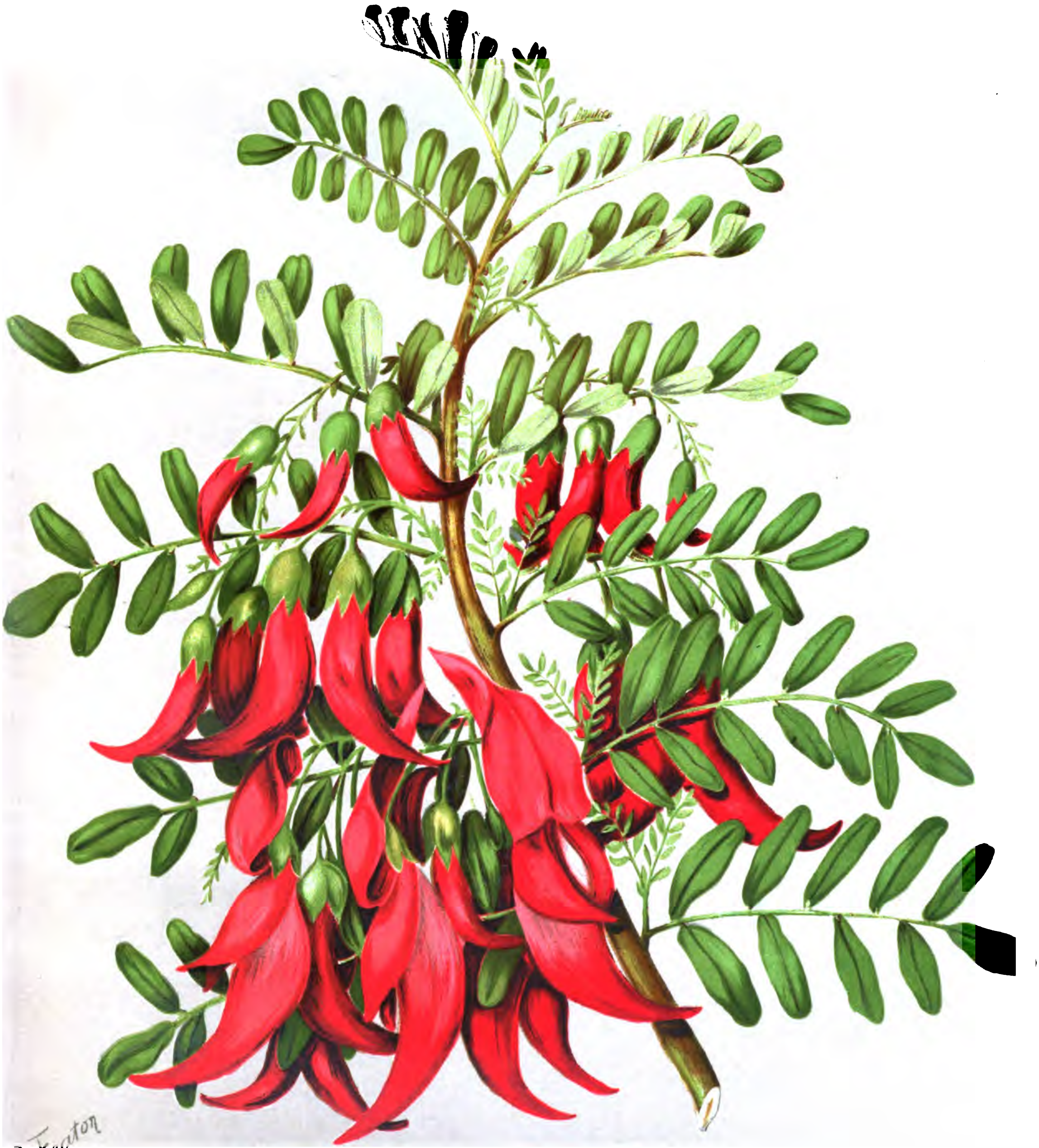
GENERIC CHARACTER. — Herbs; stems woody below, branches often trailing. Leaves, pinnate, stipuled; leaflets, many pairs. Flowers, large, red, in pendulous racemes. Calyx, companulate, 5-toothed. Standard, ovate, reflexed, about as long as the keel. Wings, oblong, or lanceolate, auricled at the base, shorter than the boat-shaped keel. Ovary, stipitate; style, ciliated below the apex; ovules, numerous. Pod, stipitate, terete, narrow-oblong, turgid, rostrate, many seeded.—*Handbook of the New Zealand Flora, p.* 52.

DESCRIPTION, etc.—A genus of most beautiful plants, found in New Zealand, Australia, and Norfolk Island. It is nearly related to a Cape of Good Hope family, *Sutherlandia*, which has bladdery pods, while the pods in the present are coriaceous. The plants are herbaceous, or woody, branching shrubs, with large handsome flowers, in terminal or axillary racemes. The name of the genus is derived from the Greek, and signifies "Glory Flower," a name peculiarly applicable to the plants. The Australian species, *Clianthus Dampieri*, or "Sturt's Pea," has the most beautiful flowers of the genus, *C. carneus*, a climber, with smaller flesh-coloured flowers, is a native of Norfolk Island, and New Zealand is well represented by *C. puniceus*, the "Parrot's Bill," a handsome under-shrub, well-known to most residents in the Northern Island.

1. CLIANTHUS PUNICEUS. (*Banks & Sol.*) The Crimson Clianthus.

SPECIFIC CHARACTER.—A branching, herbaceous, under-shrub, with prostrate or reclining branches, more or less covered with appressed hairs. Leaves, 4–6 in. long, unequally pinnate; leaflets, in 10–14 in. pairs, alternate, sessile, ½–1 in. long, linear, oblong, obtuse; stipules, triangular. Flowers, 6–15, in a raceme, scarlet, pendulous, 2 in. long. Calyx, ⅙–⅓ in. long. Standard, ovate, accuminate, reflexed when fully expanded. Wings, falcate, acute, or obtuse, half as long as the standard. Keel, very large, boat-shaped, falcate, narrowed into a long beak.—*Handbook of the New Zealand Flora, p.* 52.

DESCRIPTION, etc. — Plate No. 27. — The "KOWHAI-NGUTU-KAKA" or "PARROT'S BILL." This extremely handsome shrub is peculiar to the Northern



S. Featon

COPYRIGHT.

BOCK & COUSINS, CHROMO-LITHO.

KOWHAI-NGUTU-KAKA.—Clianthus puniceus.

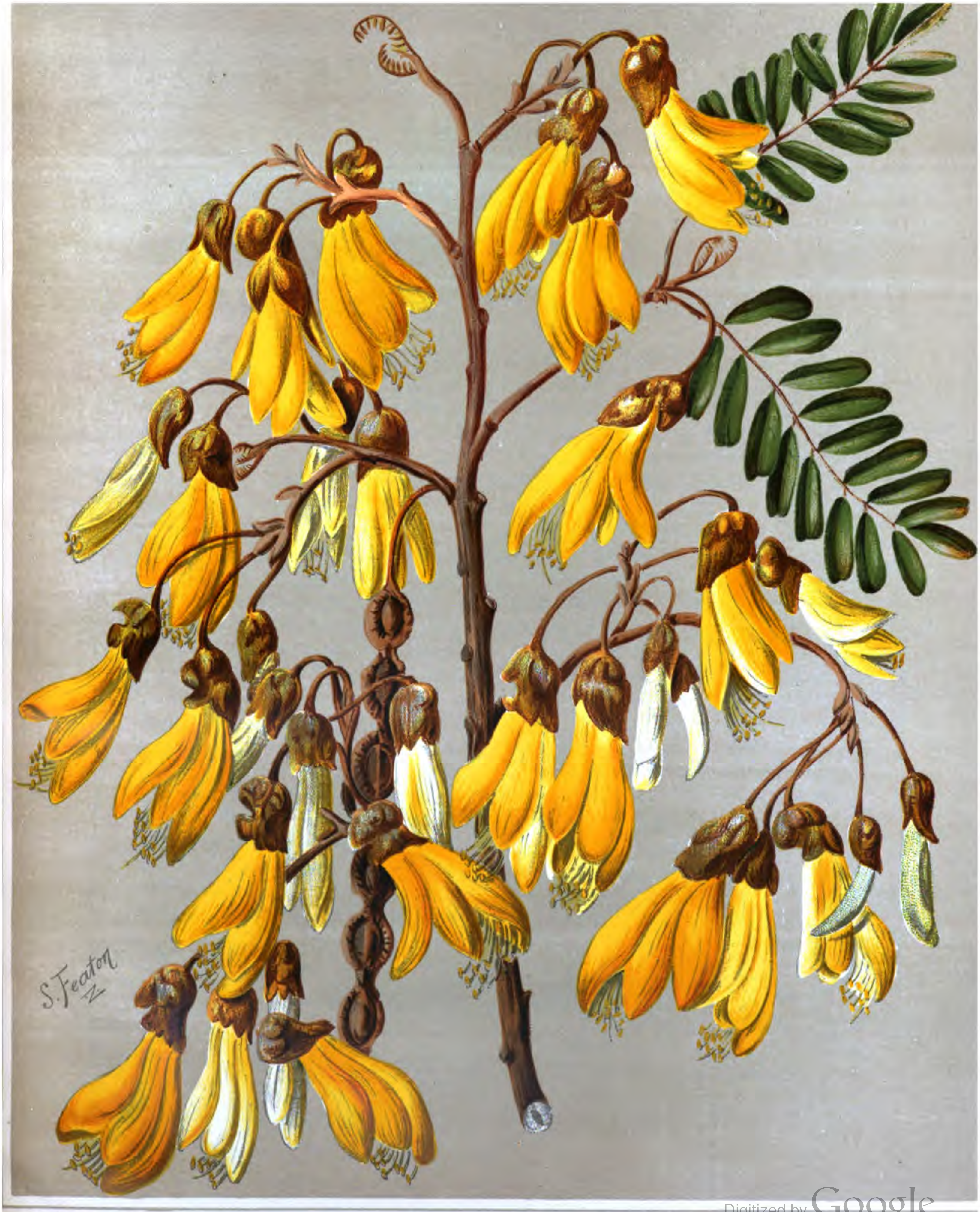
Island. It is alluded to by Sir J. D. Hooker, the illustrious botanist, and compiler of the "*Handbook*," as one of the most beautiful plants known. It has been asserted by some, that it is not indigenous to New Zealand, but there is nothing to warrant such a statement, in fact, the known history of the plant tends to oppose such a theory. Admitting that it is not found growing in a wild state in various parts of the country discloses nothing, inasmuch as there are many other New Zealand plants which were originally confined to one special area; the Clianthus being one amongst that number The plant was first seen by Banks and Solander, the distinguished naturalists, when they accompanied Captain Cook on his voyage to New Zealand in 1769. Specimens were at that time taken to England by these gentlemen, and the plant was named *Clianthus puniceus* by Dr. Solander, who established its genus. It is supposed that the specimens were collected at some place on the East Coast, north of Tologa Bay, in which district it has long been known to exist in a semi-wild state. Mr. Colenso, F.L.S., who arrived in New Zealand in 1834, and landed at the Bay of Islands, states that he saw, for the first time, this fine plant in bloom, growing in the gardens of the missionaries. He further says that he saw it growing wild, or naturally, on some islets at the entrance of the Keri-Keri River, Bay of Islands. At the same time he admits that he never, in all his travels in the North, met with it elsewhere growing in a wild state. He afterwards saw it in 1838 up to 1843, at various Maori villages on the East Coast, south of Hick's Bay. These facts should prove to us that this species is indeed indigenous, though extremely local. In further support of this testimony, the plant is unknown to botanists as indigenous to any other part of the globe, and has, from their first knowledge of it, been referred to New Zealand. Like many other plants which were esteemed for their economic value the "Kowhai-ngutu-kaka" appears to have been held in appreciation by the Maoris, who took a pleasure in protecting and cultivating it for the sake of its beauty. In this manner it has been disseminated, and preserved from extinction. To this day straggling plants may be seen around the sites of old Native pahs on the East Coast and away inland, though the time is not far distant when this beautiful species, which cannot stand the ravages of cattle, will alone be found in cultivation. *C. puniceus* was first introduced into England for cultivation in 1831, and fetched a ready sale at five pounds each plant. It is now often to be met with there in greenhouses, or on open walls with a southern aspect, where it flowers freely if protected in winter, and is much prized for its great beauty. The plant may be grown from cuttings, or seed, the latter is preferable, and blossoms in its second year, during the months of September or October. It sometimes attains a height of five or six feet, and has a somewhat straggling habit. Should the branches be cut or trimmed towards the approach of the winter season, the exposure of the sap to frost will most probably kill the plant. Cattle or horses nibbling the branches will likewise destroy it. The Clianthus for its great beauty, deserves more general attention at the hands of the settlers than is afforded it, and owing to its easy cultivation, should be a prominent feature in their gardens, making the glad months of spring gay with its rich clusters of drooping crimson flowers. Our plate portrays faithfully all the characteristics of this charming shrub.

GENUS V.

SOPHORA (*Linn.*) The Sophora.

Generic Character. — Small trees, or twiggy shrubs. Leaflet in many pairs. Flowers, pendulous, large, yellow in the New Zealand species. Calyx, rather inflated, urceolate, hemispherical, or campanulate; mouth, oblique, obscurely 5-toothed. Standard, obovate, very broad, shortly clawed. Wings, oblong, stipitate, shorter than the straight obtuse keel. Stamens, 10, all free; ovary, stipitate, linear; style, slender, slightly curved, glabrous; stigma, minute; ovules. numerous. Pod, stipitate, elongate, moniliform, terete, angled or 4-winged, indehiscent or 2-valved, few- or many-seeded. Seeds, oblong; funicle not thickened.—*Handbook of the New Zealand Flora, p.* 52.

Description, etc.—A very large genus widely spread through the tropical and temperate regions of both the Old and the New Worlds. One of its species (*Sophora tomentosa*, a shrub of variable height) being found on the sea shores of Tropical Asia, Africa, America, and Australia. The species are not numerous, but they differ greatly in general appearance, some growing into trees of large size, while others are shrubs, and one or two, herbaceous plants. All, however, agree in having pinnate leaves, with usually opposite leaflets, and an odd one at the end. The flowers are pea-like, with a rather broad standard. *S. japonica* is a very handsome tree, long ago introduced into England from China. It is of quick growth, and forms a large round-headed tree, forty feet high or more, with smooth dark-green branches, and graceful bluish-green pinnate leaves, producing in the autumn at the points of the branches large, loosely-branching panicles of small whitish or cream-coloured flowers. In China the flowers of this species are used for dyeing a yellow colour, and are employed to give the fine yellow colour to the silk used for the garments of the Mandarins, and also for dyeing blue cloth, green. All parts of this tree possess purgative properties, and it is said that even those who merely prune it are affected, as also are turners, when employed upon its fine-grained, hard wood. The genus is represented in New Zealand by *S. tetraptera*, and its varieties small or middling-sized trees, variable in habit, foliage, and size of flower. The tree is sometimes known as *Edwardsia grandiflora*, its original specific name.



COPYRIGHT.

YELLOW KOWHAI—Sophora tetraptera.

BOCK & COUSINS, CHROMO-LITHO.

1. SOPHORA TETRAPTERA (*Aiton*). The Four-winged Fruited Sophora.

Specific Character.—Leaves exstipulate, 1–6 in. long; petiole slender or stout, covered with silky or ferruginous hairs; leaflets, 6–40 pairs, very variable—from broadly obcordate to linear-oblong, ¼–¾ in. long, rounded retuse, or 2-lobed at the tip, on young plants, smaller, broader, glabrous, membranous; and in old, silky, or densely villous on one or both surfaces. Flowers, 1–2 in. long, yellow, in axillary, pendulous, 4–8-flowered racemes; peduncles short; pedicels, ⅓–1½ in. long, flexuose, and calyx densely silky. Calyx rather gibbous, ¼–⅓ in. long, hemispherical or urceolate; mouth very oblique. Standard hardly reflected, always short, obtuse. Wings linear-oblong. Keel nearly straight. Pods, 1–5 in. long, the joints oblong, 4-angled with 4 membranous wings, the outer walls separating from the coriaceous inner. Valves hardly dehiscent. Seeds, oblong, pale yellow-brown; cotyledons almost consolidated. —*Handbook of the New Zealand Flora*, *p*. 53.

Description, etc., Plate No. 28.— The "YELLOW KOWHAI."—This species is abundant throughout both islands, and is found varying in size from a small shrub to a tree thirty or forty feet high, with a trunk from one to three feet in diameter. It ascends to a height of 2,000 feet above sea level; and it is observable that it differs much in habit, foliage, size and colour of flower, according to locality. It generally blossoms in the months of September and October, but sometimes earlier, and has been known in Poverty Bay to bloom as early as July, but such a phenomenon is of rare occurence, and probably attributable to the influence of a mild season. The wood of the "Kowhai" closely resembles the European "Laburnum," and possesses great strength. It has occasionally been used for railway sleepers, piles, house-blocks, survey pegs, etc., and is everywhere valued for its great durability. The heart wood is red in colour, and where used as house-blocks, fencing posts, and piles, has been known to last in a sound state for over twenty years. The appearance of the "Kowhai" when in full bloom is extremely pretty and striking, its masses of pendulous golden flowers presenting a unique and striking picture in the landscape, more particularly as at that season it divests itself of its foliage, or nearly so, except in certain damp situations, where it is to some extent retained, as presented in our graphic plate of this species. The varieties are:—Grandiflora, a larger and more robust plant, with large flowers two inches long; and Microphylla, a plant with smaller flowers and of less robust habit; but these characters are not permanent, and many intermediate states exist. The variety *Microphylla*, and forms approaching *Grandiflora*, are common on the Island of Juan Fernandez and in South Chili. The specific name *Tetraptera* is due to the four-angled and four-winged construction of the seed pods, which is clearly shewn on our plate. The plant may easily be raised from seed, and is very hardy.

CHAPTER XXIII.

ORDER XXIII.—ROSACEÆ. The Rose Family.

CHARACTER OF THE ORDER.—Herbs, shrubs, or trees, erect or climbing; stems sometimes prickly or spinose. Leaves alternate, simple or compound, stipulate. Flowers regular, usually hermaphrodite; calyx-tube short and open, or urceolate and enclosing the carpels; lobes, 4 or 5, or none, often valvate. Petals, 4 or 5, rarely none, spreading, imbricate. Stamens numerous, few in *Acæna*, free, inserted on a perigynous ring or on the mouth of the calyx-tube; filaments subulate; anthers short, didymous. Carpels, 1 or more, 1-celled, small, enclosed in the calyx-tube, or free and clustered on a torus; style, lateral, basal, or terminal; stigma capitate; ovules, 1 or 2. Fruit, of 1 or more small achenes, free or enclosed in the calyx-tube, or of many small, free succulent drupes. Seeds ex-albuminous; testa membranous; cotyledons plano-convex, radicle, short.—*Handbook of the New Zealand Flora, p.* 53.

DESCRIPTION OF THE ORDER.—

A LARGE order very widely distributed throughout the world, which has been divided into the following sub-orders:—*Roseæ*, *Potentilleæ*, *Sanguisorbeæ*, *Amygdaleæ*, *Spiræeæ*, and *Pomeæ*. Many of the plants of the order yield edible fruits, such as raspberries, strawberries, brambles, plums, apples, pears, quinces, cherries, almonds, peaches, nectarines and apricots. Some are astringent, others yield prussic acid. The above ordinal character applies chiefly to the New Zealand genera. In some tribes (which do not occur in these islands), the calyx is apparently inferior, and otherwise differs from the character given above. The genera peculiar to New Zealand consist of:—(1.) RUBUS, a shrub, with climbing prickly stems; (2.) POTENTILLA, a herb, with pinnate leaves; (3.) GEUM, herbs, with simple or pinnate leaves; (4.) ACENÆ, herbs, with pinnate leaves.

GENUS I.

RUBUS (*Linn.*) The Bramble.

Generic Character.—Climbing shrubs (rarely erect or herbaceous); stems usually prickly. Leaves simple or compound. Flowers panicled (rarely solitary); calyx-tube open; lobes, 5, large, persistent. Petals, 5 (rarely more), orbicular or obovate. Stamens numerous. Carpels numerous, small, crowded on a small torus; style, lateral or sub-terminal, short; stigma capitate; ovules, 2, pendulous. Fruit, of small globose fleshy drupes.—*Handbook of the New Zealand Flora, p.* 54.

Description, etc.—A very large genus, embracing the blackberry, raspberry, dewberry, cloudberry, etc., found in all parts of the world, except the hottest and driest. The species are mostly shrubs, with trailing or erect prickly stems, pinnate, quinate, ternate or simply lobed leaves, and edible fruit. The plants of this family grow in all situations and in every sort of soil, vary greatly and are consequently most perplexing to the botanist. The original of the Raspberry and its varieties (*Rubus idæus*), in its wild state differs from the cultivated kinds mainly in its smaller size. *R. rhamnifolius* and *R. corylifolius* furnish the Blackberry of the hedges, in which the calyx of the fruit is reflexed; *R. fruticosus* has also a reflexed calyx, but the leaves are hoary beneath. *R. cæsius* furnishes Dewberries, distinguished by the large size of the grains, which are covered with bloom and few in number, the whole being closely clasped by the calyx. *R. saxatilis*, the Roebuck-berry, is an herbaceous species found in the mountains of Scotland, distinguished by its ternate leaves and fruit of a few red grains. This species is the badge of the McNabs; whilst *R. chamæmorus*, also an herbaceous species, is the badge of the McFarlanes. The double-flowering *Rubus* of gardens is a variety of *R. fruticosus*. Other species are grown in gardens, and two or three are deemed worthy of a conservatory. The above, including *R. laciniatus*, *R. odoratus* (the American Bramble), and *R. occidentalis*, may be considered the typical species of the genus. The name *Rubus* is derived from the Celtic word *rub*, in reference to the colour of the fruit in some species. In New Zealand there are two known species:—Rubus Australis, which has several varieties; and Rubus parva, a small prostrate shrub, with succulent, delicious fruit.

1. RUBUS AUSTRALIS (*Forst.*) The Southern Bramble.

Specific Character.—A lofty climber, armed with scattered, recurved prickles; branches very slender, pendulous. Leaves coriaceous, 3–5-nate or pinnate, with two pairs of leaflets and a terminal one; leaflets on long petioles, very variable in shape, ovate cordate, oblong lanceolate or reduced to prickly mid-ribs, 2–5 in. long, coarsely serrate or toothed, shining above, glabrous, pubescent, or tomentose beneath. Flowers very numerous, in branched, prickly, downy panicles, $\frac{1}{3}$–$\frac{1}{4}$ in. diam., fragrant. Calyx-lobes, ovate, obtuse. Petals, linear oblong, pink or whitish. Stamens, numerous. Female flowers rarer. Drupes, numerous, with short subterminal styles; when ripe, yellowish, juicy, austere.—*Handbook of the New Zealand Flora, p.* 54.

Description, etc., Figs. 1 and 2, Plate No. 29.—The "NATIVE BRAMBLE."—This well known member of our Flora is abundant on the skirts of woods throughout the Islands, and all the varieties are found as far south as Otago. "These varieties," says the author of the "*Handbook*," "though united by every intermediate form, keep their characters under cultivation." He surmises likewise, that the New Zealand species is identical with an Australian one, though he had seen but very incomplete specimens at the time of expressing this opinion. The plants blossom in October, and some varieties display a profusion of very pretty white flowers, thickly clustered, and of a large size. It is fully ripe in fruit in January or February, and affords a quantity of juicy berries of a dull yellowish colour. The fruit is edible, but does not possess the flavour or succulence of the English Blackberry, to which it bears much resemblance. It is asserted that the fruit has been made into jam by certain settlers, who pronounce it to be not unpalatable. Every traveller in the New Zealand bush is familiar with this obtrusive climber, which if he does not willingly seek, soon intrudes itself to his notice by arresting his footsteps in a manner not at all ceremonious. A scratched face and hands, and particles of disrupted clothing are remembrances fresh in the minds of many who have been exposed to the attention of this tenacious and self-asserting plant. Growing in dense masses over shrub and thicket, this terrible climber, with its thousand cruel tentacles extending over leaves, sprays, and panicles, becomes an impenetrable barrier to both man and beast, and in the ravine of the dark forest, affords a ready and invulnerable shelter to the wild pig. The Maori name of the plant is "Tataramoa," whilst the settlers designate it as the "Native Bramble," or "Bush Lawyer." The flowers of the *Rubus* are sweet-scented, and contain a quantity of honey. In the spring of the year the air is perfumed with its fragrant blossoms, and it is possible that at some future time the distiller may turn this shrub to good account. Owing to its fast growth it may be employed usefully to conceal some unsightly spot, whilst its flexuose stems may be profitably employed in the manufacture of excellent baskets. In this species both male and female plants occur, the male flowers are much larger and whiter than those of the female, which have a greenish hue, and are more sparingly produced; the system of fertilisation is carried on by insects travelling from plant to plant, and conveying the pollen grains. There are several varieties of R. AUSTRALIS, the principal ones being *Glaber*, a perfectly glabrous shrub; *Schmidelivides*, a shrub with leaves pubescent or tomentose below; and *Cissoides*, a quite glabrous shrub, with leaves sometimes reduced to bare midribs, and yellow recurved prickles, a very remarkable growth. A new variety has lately been found at Arthur's Pass in the Canterbury district, that is very distinct; its fruit is solitary, a brilliant scarlet in colour, and as large as a raspberry. It is the intention of Messrs. Adams & Sons, the well-known florists of Christchurch, to introduce this variety into cultivation, as its peculiar characteristics render it of commercial importance in the horticultural world. The species known as *R. parva* (Fig. 3, Plate No. 29), is a small prostrate shrub, with smooth, unarmed branches, which root into the ground. It was first collected by Sir James Hector, F.L.S., near Lake Brunner on the West Coast of the Middle Island, in the year 1873, where it was found growing close to the ground and covering large patches. This diminutive *Rubus* differs from all the varieties of *Rubus Australis* in its habits of growth and alternate simple leaves, and might from its delicious fruit be worthy of culture. The fruit has been made into preserves, and is also eaten by birds. The following description of this plant is given by Mr. J. Buchanan, F.L.S., in his paper "On some New Species of Plants," published in the "*Transactions and Proceedings of the New Zealand Institute, 1873,*" *Vol. VI.*:—"Leaves, simple, alternate; petiole, one inch long; leaves, 1 to 2 inches long, ¼ inch broad, linear, deeply serrated; back of mid-rib with from 2 to 6 nearly straight spines; petioles, mid-rib, and bottom of serratures with a few scattered stiff hairs. Flowers few, in short terminal panicles, or solitary with an opposite leaf; peduncles and pedicels pubescent; bracts, narrow, entire; sepals, tapering to a long narrow point, soon reflected, 3 lines long, pubescent on both sides, and ciliate, petals, white, shorter than the calyx. Fruit, oblong, tapering, the length equal to one and a-half times the breadth, succulent; carpels, numerous, angled, with a long persistent style." It is not improbable that this species is identical with, or closely allied to the variety collected by Mr. Adams at Arthur's Pass; both of which bear solitary fruit, as large as a raspberry, and are edible.

GENUS II.

POTENTILLA. (*Linn.*) The Potentilla, or Cinque-foil.

Generic Character.—Herbs (or rarely small shrubs) often silky, woolly or pubescent, with compound (rarely simple) leaves, and one or more-flowered leafy scapes or peduncles. Flowers, hermaphrodite. Calyx tube open; lobes, 4 or 5, alternating with 4 or 5 smaller outer lobes or bracteoles, persistent, valvate. Petals, 4 or 5, orbicular or obcordate. Stamens, numerous. Ovaries numerous, small, crowded on a small torus; styles, lateral or basal; stigmas, capitate; ovule, 1, pendulous. Achenes, numerous, dry, with small styles.—*Handbook of the New Zealand Flora, p.* 54.

Description, etc.—A very large genus allied to the Strawberry, abundant in the Northern Temperate and Arctic Zones, but very rarely in the Southern. The British species of most frequent occurrence are *Potentilla fragariastrum*, a humble hedge plant, with ternate leaves, conspicuous in early spring by its small white flowers, which are often mistaken for those of the Wild Strawberry; *P. anserina*, the Goose Weed, or Silver Weed, is a roadside plant well marked by its pinnate leaves, glossy, with white, silky down, and large yellow flowers; *P. reptans*, distinguished by its slender creeping "runners," quinate leaves, and large yellow flowers; and *P. tormentilla*, a humble, slender, trailing plant, of which the lower leaves are quinate, the upper ternate, and the flowers, which are yellow, have four or five petals. *P. fruticosa* has pinnate leaves, and yellow flowers; it grows in the north of Europe in bushy places, but is rare. Many species are cultivated, of which *P. nepalensis*, *P. atro-sanguinea*, *P. Thomassii*, and *P.*

hæmatochrus have furnished varieties of all shades of purple and crimson. The genus is represented in New Zealand by *P. anserina,* which is identical with the British plant, and of which there is a variety confined to these islands. The name of the genus is derived from the Latin word *potens,* powerful, in allusion to the supposed powerful medicinal qualities of some of the species.

1. POTENTILLA ANSERINA. (*Linn.*) The Goose Weed.

SPECIFIC CHARACTER.—A small, stemless plant, everywhere covered with silvery hairs; root emitting slender runners. Leaves 3–6 in. long, unequally pinnate; leaflets 5–20 pairs, the alternate ones sometimes very small, ovate oblong, or rounded, deeply incised. Scapes erect, villous, one-flowered, as long as the leaves. Flowers, ½–1 in. diam. Calyx, very silky and villous. Petals, obovate, golden-yellow. Achenes and receptacle villous.—*Handbook of the New Zealand Flora, p.* 54.

DESCRIPTION, etc.—This cosmopolitan little plant is abundant on the east side of both islands, where in many places it carpets the soil, and makes gay the grassy banks, even close up to the sea, with its abundance of faintly-scented golden flowers, It is also found throughout Temperate and Arctic Europe, Asia, and America, and occurs in Tasmania. The plant commences to bloom in November, and continues to throw out flowers incessantly until January, when it goes to fruit, the so-called fruit consisting of numerous small ovaries, crowded on a raised torus or receptacle, having somewhat the appearance of the fruit of the strawberry in its early stages, but unlike it in not being succulent. The foliage is very striking and singular, the leaves ranging from three to six inches in length, unequally pinnate, with from five to twenty pairs of leaflets, the underneath of each being covered with silky-silvery hairs. A good representation of this plant is given in our Frontispiece, easily descernible by the above-given characteristics. Some very pretty species of *Potentilla* are in cultivation in England, and splendid hybrids have been raised, having large and handsome flowers of various colours. Some of the most admired are *P. atrosanguinea,* a very dark crimson variety from Nepaul, introduced into England in 1822; *P. colorata,* also a native of Nepaul, with beautiful rose-coloured flowers; *P. erecta,* a species common on the continent of Europe, (whence it was first sent to England in 1648), with pale yellow flowers in terminal corymbs; *P. Hopwoodiana,* a beautiful hybrid, (first raised in 1830, by a nurseryman at Twickenham), between *P. formosa* and *P. erecta,* and possessing the different colours of its two parents, beautifully softened into each other; *P. Pusselliana,* likewise a hybrid, raised between *P. formosa,* with rose-coloured flowers, and *P. atropurpurea,* with dark crimson flowers, the petals of which are bright scarlet, with a dark spot at the base. The above are perhaps the most showy, but there are many others of ornamental beauty and interest. The leaves of most of the species have only three leaflets, but those of the British have five, hence the common English, or rather French, name of the genus, "CINQUEFOIL," or five leaved.

PLATE No. 29.

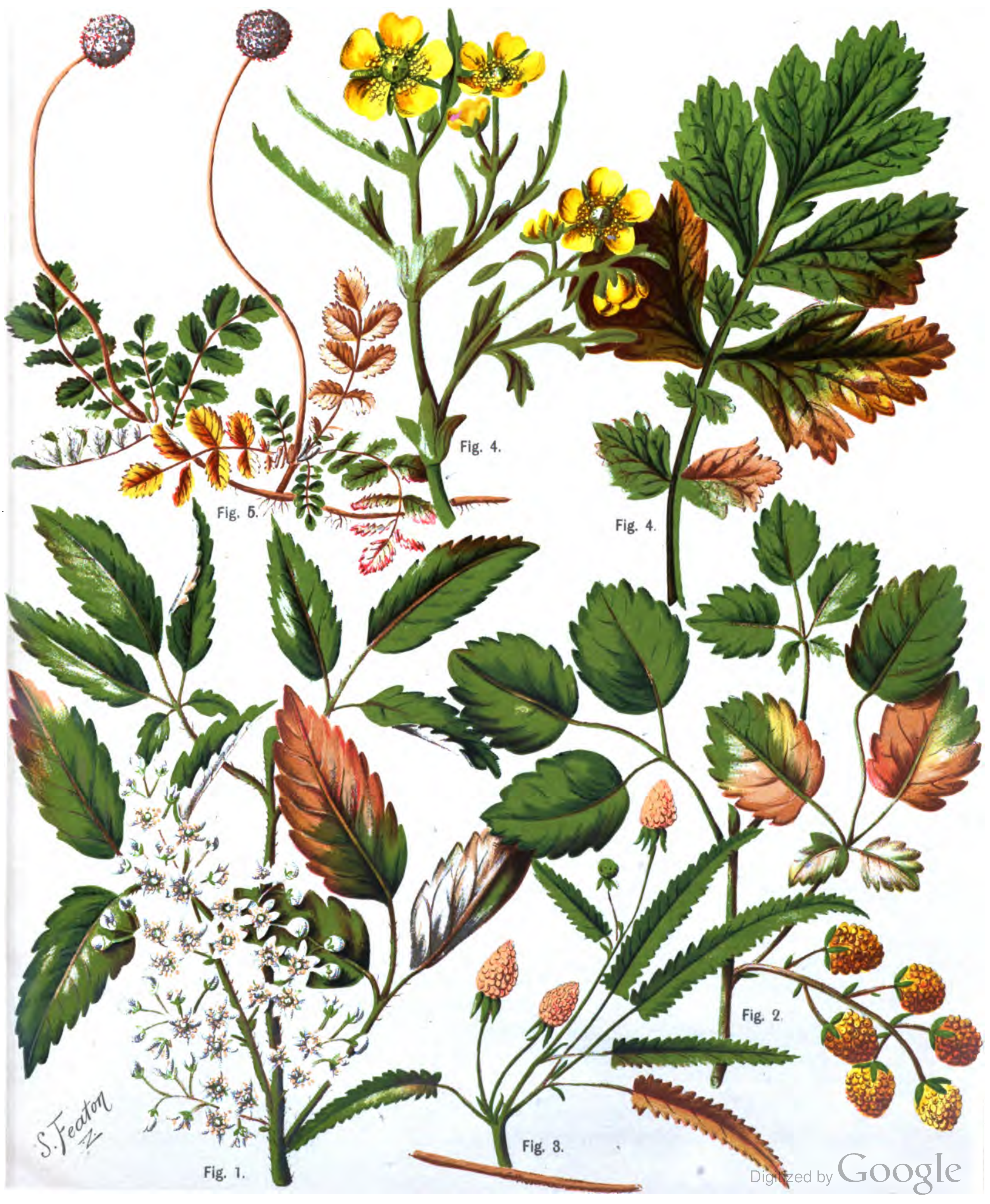


Fig. 5.
Fig. 4.
Fig. 4.
Fig. 2.
Fig. 3.
Fig. 1.
S. Featon
Z

COPYRIGHT.

1.—RUBUS AUSTRALIS. 2.—R. AUSTRALIS, Var. Glaber. 3.—RUBUS PARVA
4.—GEUM URBANUM. 5.—ACŒNA SANGUISORBŒ.

BOCK & COUSINS, CHROMO-LITHO.

GENUS III.

GEUM. (*Linn.*) The Avens.

Generic Character.—Herbs with perennial rootstocks, more or less pilose; stems erect, leafy, one or more-flowered. Radical leaves, pinnate, often reduced to one large lobed leaflet. Calyx tube open; lobes 5, alternating with 5 smaller outer lobes, or bracteoles. Petals 5, orbicular or obovate. Stamens numerous. Ovaries numerous, small, crowded on a small torus; style terminal, elongating after flowering, and then jointed, bent, or twisted at the middle; ovule solitary, ascending. Achenes dry, hairy, with very long, slender, hairy styles. Seed ascending.—*Handbook of the New Zealand Flora, p.* 55.

Description, etc.—A genus with perennial roots, common in the temperate regions of both the Northern and Southern Hemispheres. Two species are natives of Great Britain, *G. urbanum* and *G. rivale.* The former is known as Avens, or Herb Bennet, the flowers of which are yellow, with spreading petals. The Water Avens, *G. rivale,* has flowers of a dull purple colour, much larger than *urbanum,* and drooping. *G. Canadense* is found in Canada and the United States of America, where it is known by the name of Chocolate, or Blood-root, and is used as a mild tonic. The word *Geum* is derived from the Greek word *geuo,* which signifies to have an agreeable flavour, on account of the aromatic qualities which the roots of some of the plants possess. Several species are in cultivation, amongst the handsomest is *G. coccineum,* with scarlet flowers. The genus is represented in New Zealand by two species, *G. urbanum* and *G. parviflorum,* both bearing yellow flowers.

1. GEUM URBANUM. (*Linn.*) var. *strictum.* The Common Avens or Herb Bennet.

Specific Character.—A strict, rigid, leafy, erect, hairy, silky or villous herb, 2–3 ft. high, with woody, stout rhizome. Leaves alternate, 3–6 in. long, pinnate; leaflets 3–6 pairs, 1–5 in. long, sub-sessile, very variable, ovate obovate, or obcuneate, crenate, toothed, lobed or pinnatifid, alternate pairs often smaller, terminal much larger, lobed and cut; stipules large and leafy. Flowers ½–1 in. across. Calyx lobes triangular, ovate, and peduncles pubescent. Petals obovate, bright yellow, longer than the calyx. Carpels very numerous, densely villous, collected in a globose or oblong head; styles slender, deflexed, abruptly bent or twisted once towards the nearly glabrous apex; the portion beyond the bend is often broken off, when the style appears hooked at the top.—*Handbook of the New Zealand Flora, p.* 55.

Description, etc., Fig. 4, Plate No. 29.—The "KOPATA."—This plant is common in the central and southern sub-alpine parts of the Northern and throughout the Middle Island. It is also found in Tasmania, South and North Temperate America, along the lofty Andes to Fuegia, and in Central and Eastern Asia. It differs from the European plant chiefly in its stronger habit and larger petals. The genus *Geum* differs from *Potentilla* in each carpel having a hooked style, while those of *Potentilla* are straight. The root of the common Avens was called by the old herbalists "Clove-root," on account of the aromatic clove-like odour that emanates from it. It likewise possesses astringent properties, and has been used with effect in diarrhœa, dysentery, and intermittent fevers. It was formerly put into ale as a flavouring, and to prevent it from turning sour, and has been recommended to be chewed when the breath is foul. It has as well been used for flavouring gin and other spirits. The *Geum* flowers in early summer and continues to give a succession of blooms for a length of time. The flowers are a bright yellow, from a third to one inch across, and displayed on erect stems, which often attain a height of three feet. The foliage is bold and attractive, and the plant as a whole is of sufficient interest to be entitled to a vacant spot in the garden. The fruit consists of numerous dry ovaries, collected into a head, and forming a kind of burr. There are numerous species with yellow or reddish flowers, all more or less handsome, and deserving of cultivation, but the scarlet flowered *Geum*, *G. coccineum*, is the only one usually found in gardens. This species is a native of the mountains of Chili, whence it was sent to Europe in 1826. Though a native of Chili, it is quite hardy in British gardens, and flourishes well in this Colony particularly in a light soil.

2. GEUM PARVIFLORUM. (*Commerson.*) The Small-flowered Geum.

Specific Character.—A small, silky, or villous herb, 4–18 in. high, rhizome stout, woody. Leaves 3-5 in. long, pinnate; leaflets 6–8 pairs, all very small, sessile, lobed and toothed; terminal very large, rounded-reniform, 1–2 in. broad, crenate. Flowers rather crowded towards the ends of the stems, about ½ in. across. Calyx lobes broadly ovate, obtuse. Petals yellow, (sometimes white ?) longer than the calyx. Styles subulate, tips hooked, villous, with long hairs.—*Handbook of the New Zealand Flora*, *p.* 55.

Description, etc.—This small plant is almost of alpine habit. It is native to the Ruahine Mountains in the Northern Island, and common in sub-alpine localities in the Middle Island, from Nelson to Otago, at altitudes ranging from 2,000 to 5,000 feet. It is also found in Lord Auckland Group, and in South Chili and Fuegia. It has yellow flowers, crowded towards the ends of the stems, each flower being about half-an-inch across. This plant was named *Sieversia albiflora* by Sir J. D. Hooker, in his "*Flora Antarctica*," where a figure of it is given, but subsequently it was allied to *Geum* when the genus *Sieversia* was divided on account of the styles, which are long and feathery, and not hooked and naked as in *Geum*.

GENUS IV.

ACŒNA (*Vahl.*) The Acœna.

Generic Character.—Perennial herbs, stemless, or with prostrate branching stems. Leaves radical, numerous, pinnate. Scapes slender, bearing dense globose heads or spikes of minute hermaphrodite flowers. Calyx-tube urceolate, or obconic, with very contracted mouth, terete compressed or 4-angled, smooth or hispid, with simple or barbed bristles, angles often bearing stiff spines, barbed at the tip; limb none. Petals 4 or 5, small deciduous, sometimes connate at the base. Stamens 1–5; filaments short, subulate. Ovaries 1 or 2, wholly immersed in calyx-tube; style subterminal short, exserted. Stigma capitate, plumose or fimbriate; ovule pendulous. Achene enclosed in the indurated, often armed calyx-tube; pericarp membranous, bony or coriaceous.—*Handbook of the New Zealand Flora, p. 56.*

Description, etc.—A remarkable genus of small herbs, almost confined to the southern temperate and antarctic regions, the exceptions being a few Polynesian and

Mexican species, and one Chilian, which is also found in California. The leaves are unequally pinnate, the flowers small, white, dull red or purple, borne on scapes and arranged in terminal balls, or sometimes in spikes. The barbed calyces of various species from burrs, which on some runs, adhese to the sheep in such quantities as seriously to injure the fleece. *A. ovina* is a common weed in South Australia and Tasmania, and is troublesome in the above respect, it is also a pest to house-wives from its burrs adhering to linen exposed to dry on the grass. Our New Zealand species, *A. sanguisorbœ*, is also a common annoyance to travellers by clinging to their dress. There are upwards of forty species in the genus, chiefly natives of the temperate regions of South America where some of them on the Andes reach an elevation of 15,000 feet. The species indigenous to Zealand are (1.) A. SANGUISORBŒ; (2). A. ADSCENDENS; (3). A. MICROPHYLLA; (4.) A. BUCHANANI; (5.) A. INERMIS.

1. ACŒNA SANGUISORBŒ (*Vahl.*) The Native Burr.

SPECIFIC CHARACTER.—A much-branched, prostrate herb; branches rather woody at the base, tops ascending, leafy, more or less silky, especially on the leaves below, variable in size. Leaves 2–6 in. long; leaflets 8–10 pairs, variable in shape, oblong, orbicular or obovate, membranous, coarsely serrate, ¼–¾ in. long, the upper pairs rather larger than the lower. Scapes slender, 1–2 leaved. Heads globose, ⅓–½ in. diam. Calyx 4-angled; angles produced into purple bristles ¼ in. long, barbed at the tip. Petals 4, united at the base. Stamens 2. Stigma dilated, feathery.—*Handbook of the New Zealand Flora, p. 56.*

DESCRIPTION, etc., Fig. 5, Plate 29.—The "HUTIWAÍ," or "PIRIPIRI."—This troublesome weed is abundant throughout New Zealand, the Kermadec, Lord Auckland, Campbell and Macquarrie Islands. It is also a native of Tristan d'Acunha, Australia, and Tasmania. Wherever it exists the heads or burrs are pests to the flocks, and the plant itself is a troublesome garden weed. The "Hutiwai" blossoms in November, and displays, on long stems, its pinkish, globose heads in profusion; these are in February succeeded by the burrs, which by their tenacity to clothing are very objectionable. The foliage commends itself as pretty, and possessing an astringent property, the leaves are often used medicinally; an infusion of the leaves is said to afford a substitute for tea, but it is the opinion of the writer that the results are not commensurate with the trouble of brewing.

OTHER SPECIES OF ACÆNA.

1. A. ADSCENDENS (*Vahl.*)

A prostrate, glabrous or slightly hairy herb, with rather stout leafy stems, smaller leaves and fewer leaflets than *A. sanguisorbœ*; but possessing the same sized globose flower-head, of a greenish hue, and followed by the objectionable burr. It is indigenous to the mountainous districts of the Middle Island, at an altitude of from 4,000 to 7,000 feet. It is also found in Fuegia and the Falkland Islands.

3. A. MYCROPHYLLA (*Hook., F.*)

A small, tufted, procumbent plant, much branched, glabrous or nearly so, with leaves one inch long, and from two to six pairs of leaflets. The scapes are short, surmounted with globose heads, large for the size of the plant. It is indigenous to both the Northern and Middle Islands, at high elevations.

4. A. BUCHANANI (*Hook., F.*)

A herb in habit and size, similar to *A. microphylla,* but the young branches, petioles and calyx are villous, with silky hairs. The flowers are much fewer in a head. The spines of the calyx are curved, yellow, and usually with a few bristles at the tip. As in *A. microphylla,* the fruiting calyx is sometimes not spinescent. It is a native of the Middle Island, about the Otago Lake District, and has very pale-green foliage.

5. A. INERMIS (*Hook. F.*)

A small prostrate herb, slightly silky tufted, and much-branched below. The leaves are 1 to 4 inches long, with small orbicular leaflets in 4 to 6 pairs. The scapes are leafless, or with a small bract, or solitary leaf 2 to 3 inches long, which support a globose head one-third of an inch in diameter. The fruiting calyx of this species is not spinescent. It is indigenous to the mountainous districts of Nelson and the Kowai River on the East Coast of the Middle Island, at an altitude of 1500 to 3000 feet.

6. A. NOVÆ ZELANDIE (*Kirk*).

A prostrate herb, with branches occasionally woody at the base, with leaves, 2 to 3 inches long, and leaflets sessile, or in short pedicels, elliptic, rounded at both ends and sharply toothed. The scape is leafless and glabrous, surmounted with a globose head larger and less compact than *A. sanguisorbæ,* owing to the larger size of the flowers and spreading bristles. It is reported by Mr. Kirk, F.L.S., as common on the Auckland Isthmus and in other parts of the province. This species has been cultivated in English gardens. The flowers are green, with 4 reddish-purple bristles tipped with numerous white barbs. Petals 4, green. The foliage is of a pale green hue. We are indebted to

Professor Kirk for introducing this plant to the notice of the botanical world as far back as 1870, when specimens were forwarded to Kew for identification. An apparent hybrid *Acœna* was observed by Mr. J. Buchannan, F.L.S., in the same year, in the neighbour-of Wellington, partaking of the character of *Acœna sanguisorbœ,* our indigenous species, and *A. ovina,* an introduced species from Australia, both found in the same locality. The first of these having the flowers in globose heads, whilst the Australian species has the flowers arranged in long obovate spikes. The supposed hybrid shows below the globose heads, several small clusters of flowers, axillary to bracts on the peduncle, thus becoming an intermediate form. "If the theory of hybridization," says Mr. Buchanan, "prove unsuitable, this form must be accepted as a recent variation from *A. sanguisorbœ.*" Professor Kirk is disposed to concur in this opinion.

Chapter XXIV.

Order XXIV.—SAXIFRAGEÆ. The Saxifrage Family.

Character of the Order.—Herbs, shrubs, or trees. Leaves opposite, or alternate, simple or compound, stipulate or exstipulate. Flowers usually hermaphrodite, and regular. Calyx free or adnate to the ovary; lobes 4 or 5-valvate or imbricate, usually small and coriaceous. Disk perigynous or epigynous. Stamens usually as many or twice as many as the petals, in *Donatia* fewer. Ovary 2–5 celled; styles 2–5; Stigmas usually capitate; ovules numerous, on axile or rarely parietal placentas. Fruit generally a capsule, with many seeds, almost a berry in *Carpodetus*, unknown in *Donatia*. Seeds usually small; albumen copious; embryo terete (large, with scanty albumen, in *Ixerba*.)—*Handbook of the New Zealand Flora, p. 57.*

Description of the Order.—

LARGE Order containing many different forms, "so that," says the Editor of the "*Handbook,*" "it is impossible to define it tersely." The immense herbaceous tribe of Saxifrages proper is represented by *Donatia* alone in New Zealand. Taken in a general sense the order is accepted by botanists to include the three following sub-orders or tribes:—1. SAXIFRAGEÆ proper; herbs chiefly inhabiting temperate or cold regions, with alternate or rarely opposite leaves, without stipules, containing besides the large genus *Saxifrageæ*, about twenty others. 2. HYDRANGEÆ; shrubs, chiefly extra-tropical, from Asia or America, with opposite individual leaves without stipules, comprising *Hydrangea*, *Adamia*, and about six other genera. 3. CUNONIACEÆ; tropical or southern trees or shrubs, with opposite leaves and interpetiolar stipules; containing about twenty genera, of which the best known are, *Weinmannia*, *Ceratopetalum*, *Acrophyllum*, *Callicoma*, *Cunonia*, etc. The most popular genera in this order are *Hydrangea* and *Saxifraga*, the former, however, contains only shrubs, whilst the latter are herbaceous. The genus *Saxifraga* is very extensive, and includes amongst its members *S. umbrosa*, popularly known as "London Pride," or "None so Pretty." This well-known species is a native of England, Ireland, and many parts of the Continent of Europe. In Ireland it is termed "St. Patrick's Cabbage." Various medicinal properties have been supposed to belong to this order. The name "Saxifraga" means stone-breaking, from the Latin *saxum*, a rock, and *frango*, to break, being supposed to crack the rock, in the crevices of which the plants commonly grow. The ancient Romans, it is stated, had their rock-breaking plant, called "Saxifraga," or "Sassafras." The power of cleaving rocks, or breaking hard substances, enters very largely into their traditions. The other well-known species are *S. crassifolia* and *S. ligulata*, the former is a native of Siberia, and the latter of Nepaul; both of them are in cultivation in Britain. The plants of this genus are very susceptible to cold winds, or frost, and require protection. The Meadow Saxifrage—*S. granulata*—is a well-known British plant, with white flowers, common in the sandy soils of England. The order is a very beautiful one in New Zealand, and is well represented by—(1.) **Donatia**, a tufted moss-like herb, with terminal, sessile flowers; (2.) **Quintinia**, shrubs or trees, with alternate leaves; (3.) **Ixerba**, a shrub or tree, with alternate leaves; (4.) **Carpodetus**, a shrub or tree, with alternate leaves; (5.) **Ackama**, a tree, with opposite pinnate leaves; (6.) **Weinmannia**, trees or shrubs, with opposite leaves or leaflets, one to three, or pinnate.

GENUS I.

DONATIA. (*Forst.*) The Donatia.

Generic Character.—Densely tufted, moss-like, Alpine herbs, with very numerous leaves, densely imbricating all round the branches. Flowers terminal, sessile, solitary, white. Calyx-tube obconic, adnate with the ovary; lobes 4 or 5, equal or unequal. Petals 5–10, linear or ovate. Stamens 2 or 3, inserted on an epigynous disk; filaments cohering at their bases, with the bases of the styles; anthers didymous, bursting outwardly. Ovary inferior, 2 or 3-celled; styles 2 or 3, subulate, recurved. Stigmas simple or capitate; ovules numerous, on placentas which are pendulous from the top of the cells. Fruit unknown.—*Handbook of the New Zealand Flora, p. 58.*

Description, etc.—A genus of but two species, one Fuegian, the other a native of the summits of the Tasmanian and New Zealand mountains. In the absence of fruit, Sir J. D. Hooker has placed this genus in the order *Saxifrageæ*, and up to a recent date its exact systematic position was a matter of considerable uncertainty. It is now generally accepted by botanists that *Donatia* should be placed along with the genus *Phyllachne*, among the *Stylidieæ*. Science is indebted to Mr. Petrie, Inspector of Schools at Otago, for the trouble taken by him in furnishing Baron Von Mueller, the celebrated naturalist, with specimens in fruit, thus enabling him to prove the systematic position of the plant beyond doubt. Some descriptive notes on this subject, communicated by Mr. G. M. Thomson, F.L.S., are to be found in Vol. XIII., page 289, "*Transactions and*

Proceedings of the New Zealand Institute, 1880." It is here due to state that botanical science in New Zealand has been much enriched by the researches and literary contributions of this gentleman, who is an ardent student of nature.

1. DONATIA NOVÆ ZELANDIÆ. (*Hook.*, *F.*) The New Zealand Donatia.

Specific Character.—Stems very short, including the leaves as thick as the little finger, densely clothed with leaves, of which the upper are bright green, the lower brown. Leaves erect, appressed, $\frac{1}{3}$ in. long, coriaceous, linear-subulate, obtuse, villous at the base, nerveless, punctate. Calyx-lobes and petals 5, the latter thick, ovate-oblong, blunt, $\frac{1}{10}$ in. long. Stamens 2, filaments short. Styles 2.—*Handbook of the New Zealand Flora, p. 58.*

Description, etc.—This little Alpine plant is indigenous to the mountains near Port Preservation on the south-western coast of Southland, in the Middle Island; Dusky Bay, on the high land; and contiguous to the Ramsay Glacier, at an elevation of 4,200 feet. It is likewise reported by Mr. Petrie as occurring on the low lands of Stewart Island, which is worthy of note, as the plant has not been found either in the bogs of Southland, or on the Bluff Hill, which offers many situations favourable for its growth. The lowest elevation at which it has been found, Mr. Petrie remarks in his article on the Flora of Stewart Island, in Vol. XIII., "*Transactions and Proceedings of the New Zealand Institute*," page 325, as seen by himself, was at an elevation of 3,000 feet on the summit of Mangatua, near the Taieri Plain. It is an evidence that the climate of Stewart Island must be of a severe character that a plant which does not descend below 3,000 feet on the mainland should flourish at sea level at Paterson Inlet. The plant has a moss-like appearance, tufted stems, densely clothed with imbricating leaves all round; the stem and leaves included being about as thick as the little finger, and very short.

GENUS II.

QUINTINIA. (*A.D.C.*) The Quintinia.

Generic Character.—Glabrous shrubs or trees. Leaves alternate, persistent, exstipulate. Flowers small, white, in axillary or terminal many-flowered racemes. Calyx-tube obconic, adnate to the ovary; teeth 5, persistent. Petals 5, oblong, obtuse, deciduous, imbricate. Stamens 5; filaments short, subulate. Ovary inferior, 3–5 celled, its free conical top narrowed into a conical, persistent furrowed style; stigmas capitate, 3–5 lobed; ovules very numerous. Capsule small, inferior, or half superior, coriaceous, obovoid, 3–5-ribbed, 1-celled, many seeded, dehiscing at the tip between the styles. Seeds elongate, imbricating; testa winged.—*Handbook of the New Zealand Flora, p. 58.*

Description, etc.—A genus peculiar to South Australia and New Zealand, nearly related to the well-known *Escallonias* of our gardens, and differing only from them in the three to five instead of two-celled ovary. The genus embodies four species, two of which are Australian, and two belong to New Zealand. The latter are covered with small lepidote scales, beneath which a viscid, gummy substance is secreted. All are bushes or small trees, and bear white or lilac flowers the size of those of the

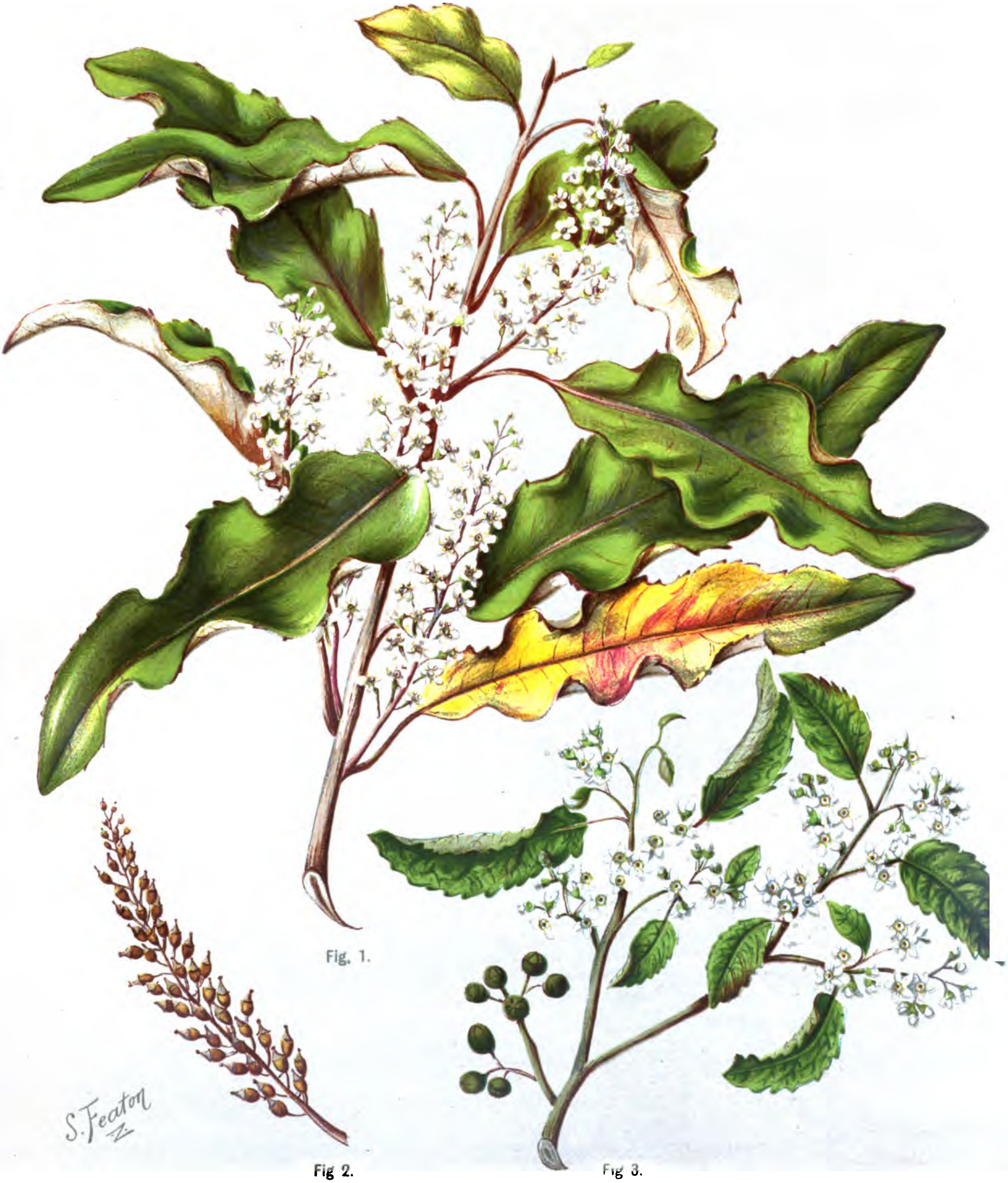


Fig. 1.
S. Featon
Fig 2.
Fig 3.

COPYRIGHT.

BOCK & COUSINS, CHROMO-LITHO.

1.—QUINTINIA SERRATA. 2.—Fruit of QUINTINIA SERRATA. 3.—CARPODETUS SERRATUS.

Privet, disposed in axillary or terminal racemes. The fruit when ripe is a small angular capsule, with numerous delicately winged seeds. The genus is named in honour of La Quintinie, a French writer on Horticulture. The New Zealand species are—1. *Quintinia serrata,* a small erect tree, with leaves remotely toothed; 2. *Q. elliptica,* likewise a small tree, of lesser dimensions, and smaller foliage.

1. QUINTINIA SERRATA. (*A. Cunn.*) The Serrate-leaved Quintinia.

Specific Character.—A small erect tree, branchlets, leaves, and racemes covered with lepidote scales. Young parts viscid. Leaves petioled, 3–6 in. long, narrow, linear-lanceolate or oblong, rather obtuse, remotely, irregularly and obtusely serrate, margins undulate, when dry coriaceous, yellow-brown above, red-brown below. Raceme shorter than the leaves. Flowers ¼ in. diameter. Capsules ⅙ in. long.—*Handbook of the New Zealand Flora, p. 59.*

Description, etc.—Fig. 1, Plate No. 30.—The "NATIVE LILAC."—This handsome small tree is not uncommon in forests in the Northern Island, and is native to the Aorere Valley, in the Nelson district of the Middle Island, under the form of a variety, with broader, oblong-lanceolate leaves and more viscid in character than the Northern plant. The typical form of this tree is confined to the kauri district, about Auckland, where it varies from a shrub with lilac-coloured flowers, to a tree forty feet high, its trunk sometimes measuring four feet six inches in circumference. In the Southern district the variety forms a large portion of the forest, attaining greater dimensions, and shewing clean and well-grown trunks, adapted for a variety of economical purposes, as tramway sleepers, fence material, etc. Its durability is probably about equal to the wood of the Tawhero—*Weinmannia racemosa*—or Black Birch of Otago, to which it is indeed closely allied. The Quintinia may be termed a sub-Alpine tree in the Northern Island where it is found at an elevation ranging from 1800 feet to 2700 feet, getting more stunted in growth as it ascends. As evidenced by our plate the Quintina is a handsome and attractive tree when in bloom, and altogether a worthy member of the beautiful family of Saxifrageæ.

2. QUINTINIA ELLIPTICA (*Hook. F.*) The Elliptic-leaved Quintinia.

Specific Character.—Very similar to *Quintinia serrata* but smaller. Leaves, 2 in. long, on rather longer petioles, very obtuse, broader, and more obscurely sinuate serrate.—*Handbook of the New Zealand Flora, p. 59.*

Description, etc.—This species is very similar to the foregoing, but is much smaller in all its parts. It is found in the mountain woods of the East Coast of the Northern Island, "and is," says the Editor of the *Handbook,* "probably a variety of *Quintinia serrata.*" This opinion has likewise been endorsed by Mr. Cheeseman, F.L.S., and other competent botanists.

GENUS. III.

IXERBA (*A. Cunn.*) The Ixerba.

Generic Character.—Leaves, exstipulate, opposite, alternate or whorled, glandular-serrated. Flowers, large, white, panicled. Calyx-tube, adnate with the base of the ovary; lobes 5, deciduous, imbricate. Petals 5, inserted beneath a 5-lobed disk, obovate, acute, clawed, coriaceous, imbricate. Stamens 5; filaments filiform; anthers linear-oblong. Ovary superior, conical, 5-lobed, 5-celled, narrowed into a subulate, acute, 5-furrowed, twisted style, stigmas acute. Ovules two in each cell, collaterally suspended. Capsules very coriaceous, shortly ovoid, 5-celled, dehiscing through the style loculicidally; valves cohering below, 2-partite above. Seeds, oblong, compressed, with a thick funicle, and shining, clouded, or black testa, large embryo, and little albumen.—*Handbook of the New Zealand Flora, p. 59.*

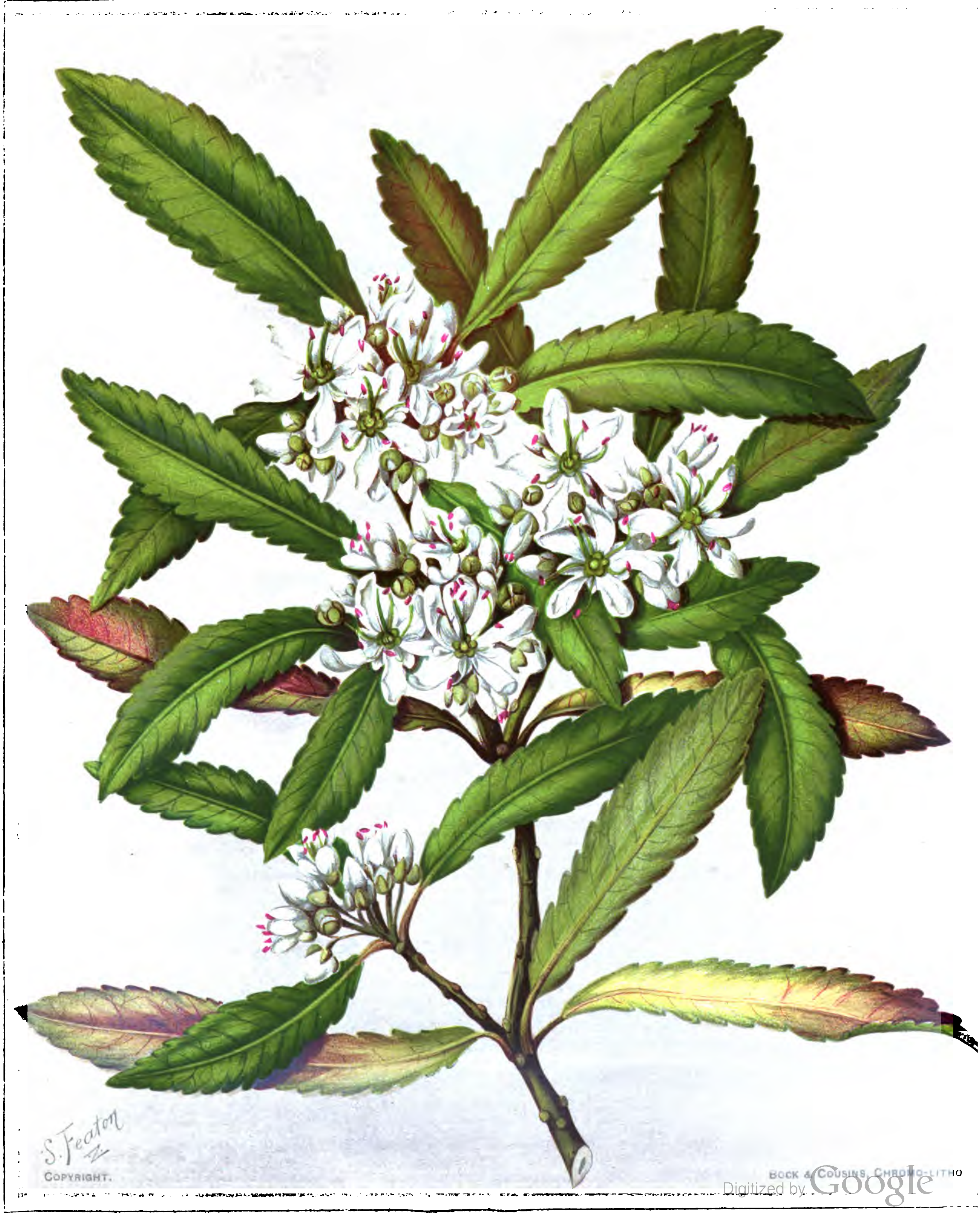
Description, etc.—A genus, represented by a single species, *Ixerba brexioides*, an elegant evergreen tree confined to New Zealand. The leaves are glossy, leathery, and toothed. The flowers, which are large, consist of five calyx leaves, five petals, five stamens, and a lobed disk, surrounding a five-celled ovary. The name "Ixerba" is an anagram of "Brexia."

1. IXERBA BREXIOIDES (*A Cunn.*)

Specific Character.—A small tree 20 ft. high. Leaves coriaceous, linear, or linear-lanceolate, 4 in. long by ⅓ in. broad, but very variable. Flowers, 1⅓–1¾ in. diam. Capsule ¾ in. broad. Seed, ⅙–¼ in. long.—*Handbook of the New Zealand Flora, p. 59.*

Description, etc.—Plate No. 31.—The "TAWARI."—This elegant tree, is confined to the Northern Island. It is found in the mountain woods, and attains its largest dimensions at from 1500 feet to 2000 feet elevation, and is most plentiful in the kauri district. The Tawari is a very attractive tree with long lanceolate leaves, and large white flowers, plentifully displayed in the season. It often attains a height of fifty feet, with a trunk from one to three feet in diameter, but is generally smaller. The wood is white, hard, dense, and heavy, and apparently possessed of great durability, but has not been much utilized. The tree is not very common, its most northern habitat is the Bay of Islands. In the forests of the East Coast it may be designated sub-Alpine, as it is rarely met with under an elevation of 2000 feet, and in some instances has been found as high as 3200 feet, but becomes stunted in growth at the higher elevations. It blossoms in the month of June, and is very attractive at that season. The subject of our illustration was collected on the slopes of Mount Hikurangi in the Waiapu district. If the nurserymen would turn their best attention to this tree, and establish it as a garden denizen, it would prove a most beautiful addition, and the thanks of all lovers of New Zealand Flora would be due to them.

PLATE No. 31.



TAWARI— Ixerba brexioides

GENUS IV.

CARPODETUS. (*Forst.*) The Carpodetus.

GENERIC CHARACTER. — Leaves alternate, exstipulate, evergreen. Flowers panicled. Calyx-tube, turbinate, connate with the ovary; lobes 5 or 6, short, deciduous. Petals, 5 or 6, inserted under an epigynous disk, spreading, valvate. Stamens 5 or 6, filaments short, subulate; anthers oblong. Ovary inferior, with a swollen top, 3–5 celled; style slender, stigma capitate; ovules very numerous. Fruit almost fleshy, glabrous, indehiscent, girt at the middle by the calyx limb, 3–5 celled many-seeded. Seeds, small, pendulous, ovoid; testa coriaceous, pitted: embryo minute, in the base of fleshy albumen.—*Handbook of the New Zealand Flora, p. 59.*

DESCRIPTION, etc.—A genus peculiar to New Zealand, consisting of one species, *C. serratus*, with very beautiful evergreen foliage and attractive white flowers. The name of the genus is derived from two Greek words signifying fruit-bound, in allusion to the fruit being girt by the calyx. *C. serratus* has much the appearance of a *Rhamnus*, but in its fruit is more closely allied to *Escallonia.*

1. CARPODETUS SERRATUS (*Forst.*) The Serrate-leaved Carpodetus.

SPECIFIC CHARACTER.—A shrub or small tree 10–30 ft. high; trunk usually slender, branches spreading in a fan-shaped manner; all parts more or less pilose. Leaves, petioled, ovate-oblong, obtuse, 1–1½ in., much smaller on young plants, rather membranous, acutely serrate. Panicle, cymose, shorter than the leaves. Flowers, ¼ in. diam., white, Fruit, size of a pepper-corn.—*Handbook of the New Zealand Flora, p. 59.*

DESCRIPTION, etc.—Fig. 2, Plate No. 30.—The "PUTA-PUTA-WETA."—This graceful looking shrub, or sometimes small tree, is found in both the Northern and Middle Islands. It may not be considered common, and is most frequently met with in low damp ground, along the banks of rivers and streams. The foliage is a very bright green, almost emerald, and beautifully mottled with a darker shade of green, following the course of the nerves. The branches spread out in a fan-shaped form, which gives a graceful and airy appearance to the shrub, and calls for a speedy recognition amongst the surrounding undergrowth. The wood is soft but very tough, and is greatly prized for axe handles, for which it is admirably adapted, when it can be obtained of sufficient size. Usually the trunk is slender, and unfitted for the purpose. The Puta-puta-weta blossoms in October and November, when it is charmingly pretty, being covered with masses of conspicuous fragrant white star-shaped flowers, displayed in panicles, which produce a large amount of honey, but the plant is apparently dependent altogether on insects for fertilisation. The native name of this species is due to the Weta, an insect of hole boring proclivities, having shewn a decided partiality to this shrub, which it perforates in a peculiar manner, literally making it full of holes, or, as expressed in Maori, Puta-puta. As a garden shrub the *Carpodetus* would make a very pretty addition, and it is even possible that with attention it would prove of use as an excellent hedge plant.

GENUS V.

ACKAMA (*A. Cunn.*) The Ackama.

Generic Character.—A small tree. Leaves, opposite, pinnate, stipulate. Flowers, small, panicled, unisexual. Calyx, inferior, 5-partite; lobes, valvate. Petals, 5, linear-spathulate, inserted beneath a 10-lobed disk, about as long as the calyx. Stamens, 10; filaments filiform, the alternate longer; anthers didymous, ovary free, hirsute, 2-celled; styles 2, filiform, persistent; ovules very numerous on parietal placentas. Capsule small, coriaceous, turgid, 2-celled, septicidally 2-valved, valves gaping inwardly. Seeds, turgid, ovoid, apiculate; testa smooth, lax, pilose; embryo cylindric, albumen scanty.—*Handbook of the New Zealand Flora, p. 60.*

Description, etc.—A genus peculiar to New Zealand consisting of one species, *Ackama rosæfolia*, a very graceful tree, found in the kauri districts north of Auckland. In general appearance it resembles *Pyrus aucuparia*, the Mountain Ash of modern Europe. It affects sheltered valleys where in a rich soil it often attains a height of forty feet.

1. ACKAMA ROSŒFOLIA (*A. Cunn.*) The Rose-leaved Ackama.

Specific Character.—Tree 30–40 ft. high. Leaves, pubescent, imparipinnate, 3–10 in. long. Leaflets in 3–6 pairs subsessile, linear-oblong, acute, acutely serrate, 1–2 in. long, rather membranous, the upper larger; stipules deciduous, leafy, toothed. Flowers, small 1/12 in. diam. in spreading branched panicles, sessile on the branchlets. Capsule, very small.—*Handbook of the New Zealand Flora. p. 60.*

Description, etc.—This handsome tree is indigenous to the northern parts of the Northern Island. At the Bay of Islands it is not uncommon in the woods, and at Hokianga, on the west coast, it is found in sheltered valleys where it grows to a height of thirty or forty feet, and developes a trunk sometimes two feet in diameter. It has beautiful pinnate leaves, enlivened by panicles of flowers greatly resembling in appearance the Mountain Ash of Europe. The wood is similar to that of the Tawhero, *Wienmannia racemosa*, and may be of service for temporary purposes as tramway and small sleepers, wharf piles, etc., but opinion is divided as to its general durability. It is however deemed to be good firewood, and the bark is useful for tanning purposes. The tree is called "Maka-maka" by the Natives.

GENUS VI.

WEINMANNIA (*Linn.*) The Weinmannia.

Generic Character.—Shrubs or trees. Leaves opposite, stipulate, 1–3 foliolate or pinnate. Flowers, racemose, small. Calyx inferior, tube short; limb 4–5-partite, imbricate. Petals 4–5, inserted under the edge of a lobed disk, imbricate. Stamens 8–10; filaments filiform, anthers didymous. Ovary, free, ovoid or conical, 2-celled, narrowed into two beaks; styles filiform; ovules few or many, placentas inserted above the middle in the axes of the cells. Capsule small, coriaceous, 2-celled, septicidally 2-valved, valves gaping inwardly. Seeds oblong reniform or sub-globose; testa membranous, often pilose; embryo terete; albumen fleshy.—*Handbook of the New Zealand Flora, p. 60.*

Description, etc.—The plants belonging to this genus are found in various parts of South America, both in the temperate and tropical regions, in Southern Africa, Madagascar, and the neighbouring Islands. They are evergreen shrubs or trees with simple

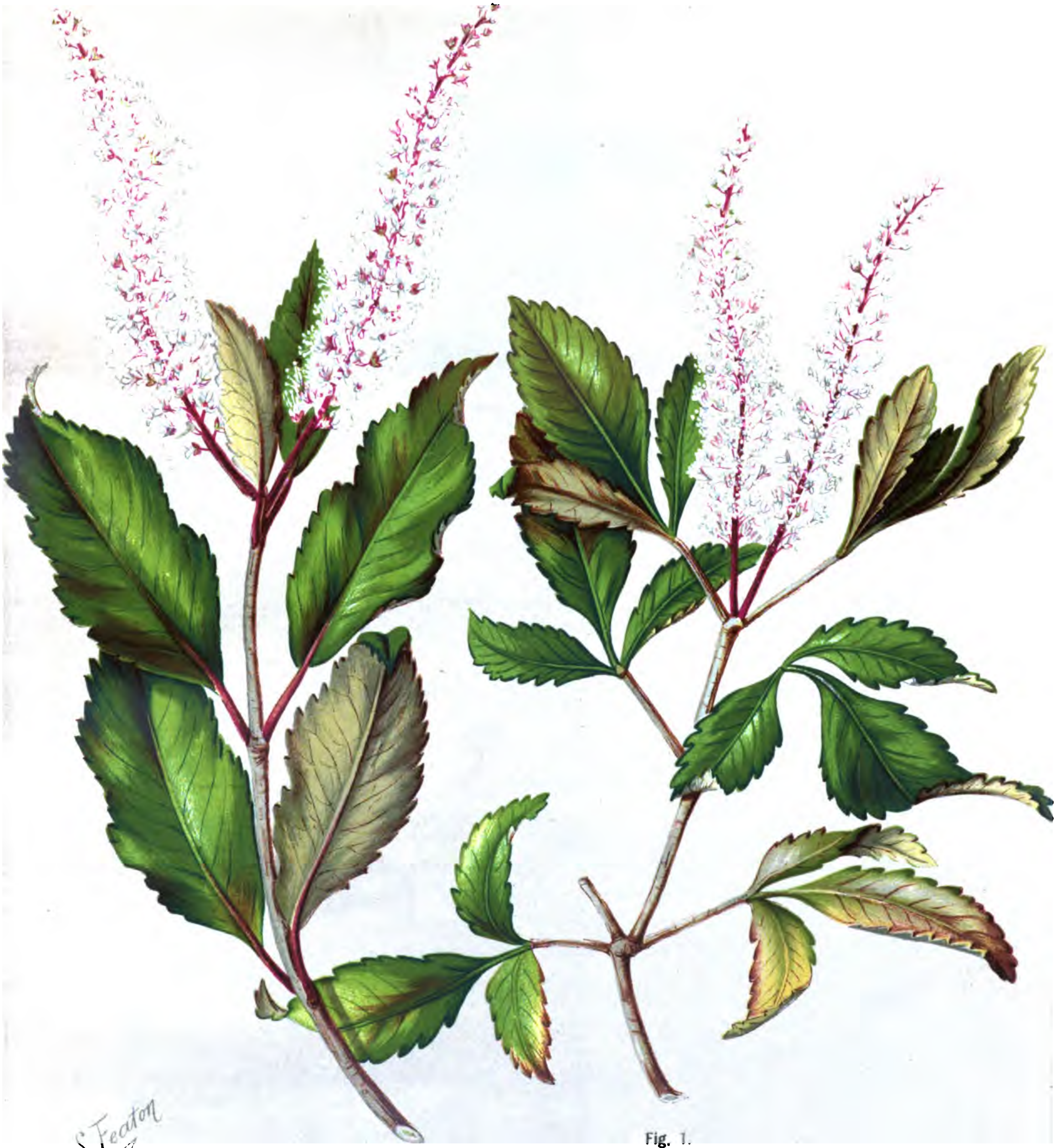


Fig. 1.

Fig 2.

COPYRIGHT.

BOCK & COUSINS, CHROMO-LITHO.

1—Wienmannia silvicola 2—Wienmannia racemosa

or compound opposite leaves, and racemes of smallish, usually tufted flowers. The tree species of *Weinmannia* affords a soft light wood useful in common carpentry and cabinet work, though obtainable only in planks of small size. The astringent bark is useful for tanning purposes, and one species *W. tinctoria* is employed for dyeing red. The genus is represented in New Zealand by two species: (1.) WEINMANNIA SILVICOLA, a small tree with 3-foliolate or pinnate leaves; (2.) W. RACEMOSA, a small tree with 1-foliolate leaves, of larger size, and more leathery in texture than the former.

1. WEINMANNIA SILVICOLA (*Banks & Sol.*) The Forest Weinmannia.

SPECIFIC CHARACTER.—A small tree 20–30 ft. high with dark bark, the young leaves, branchlets, inflorescence and costa of leaf below all pubescent or glabrescent. Leaves opposite, 1–3 foliolate, or imparipinnate, (on the same specimen), 1–3 in. long; leaflets variable, 1–2 in. long, obovate-oblong, or lanceolate, acute or acuminate, coarsely serrate, coriaceous, punctate, beneath, young ones membranous, glabrous or pubescent below, usually narrowed into petiole; stipules leafy, oblong, entire or toothed. Racemes 2–4 in., slender, many-flowered. Flowers $\frac{1}{10}$ in. diam,, pedicelled, white. Capsule glabrous, or minutely hairy, $\frac{1}{8}$–$\frac{1}{6}$ in. long.—*Handbook of the New Zealand Flora, p. 60.*

DESCRIPTION, etc.—Fig. 1, Plate No. 32.—The "TOWAI."—This handsome tree is abundant throughout the woods of the Northern Island from the North Cape to the Hauraki Gulf, and ascends to an elevation of 2,300 feet. For a length of time the Thames district was considered the southern habitat of this species, but research has proved that it may be met with as far south as the East Cape. It ascends from sea level to a height of 2,300 feet, and attains its maximum dimensions at elevations of 1,500 feet and upwards. In some districts the Towai forms a considerable portion of the forests, and often attains a height of sixty feet, with a trunk one to three feet in diameter. The wood is similar in quality to its ally *W. racemosa*, but is denser, and of finer grain; it has not been used in any extensive manner, so that little can be said as to its durability, but it is probable that for rough structures, piles, or sleepers, it would be of service. The tree blossoms in early summer, and bears a profusion of erect racemes of pinkish flowers. Its bark is valuable for tanning purposes, and is extensively used; on this account alone the tree may be considered an important member of our economic flora. The varied manner of the foliage in this species is interesting. In the young state, its leaves are imparipinnate, (unequally pinnate) while in the older tree they assume a ternate form in the upper branches; and in the full adult tree, the foliage becomes unifoliate (one leaved), in the upper branches, and ternate in the lower. The above observations are from the researches of Mr. J. Buchanan, F.L.S., who in following out the subject, in Vol. 2, "*Transactions and Proceedings of the New Zealand Institute*," *p. 241*, says: "Thus I infer, shewing the typical foliage of two species now extinct It is even probable that the species has passed through one form that still exists in the south, *W. racemosa*, which also shows the extinct form of ternate leaves, but only in the young plants, and on the lower branches." This tree is sometimes called Tawhero, or Kamai, and it is not unusually confounded with *W. racemosa,* the Tawhero or Kamai proper. In the same manner the Tawhero is confused with this species, by the uninitiated.

2. WEINMANNIA RACEMOSA. (*Forst.*) The Racemose-flowered Weinmannia.

Specific Character.—A large-leaved, more coriaceous plant than the preceding, glabrous, except in the raceme. Flowers large; leaves broader, 1-foliolate. Leaflets 1–3 in., oblong-ovate or lanceolote, or orbicular-ovate, obtuse, sinuate, serrate; ovary coriaceous, punctate beneath. Racemes numerous, stout, erect, very many-flowered. Flowers ⅙ in. diam. Capsules ¼ in. long, sometimes 3-valved.—*Handbook of the New Zealand Flora, p.* 61.

Description, etc.—Fig. 2, Plate No. 32.—The "TAWHERO," or "KAMAI." This handsome and useful tree is found in both Islands; extending from the Hauraki Gulf in the Northern Island, down to the Bluff in Southland. It ascends from the sea level to a height of 3,000 feet, and reaches its maxium developement in Westland, and Southland, where it attains a height of sixty feet, with a trunk one to three feet in diameter. The timber is hard when cut, but twists and cracks to an excessive degree, which necessarily detracts from its value, in respect to strength and durability. The Tawhero is inferior in the beauty of its flowers to the Towai—*W. silvicola*—but superior to it in regard to its timber, and in the value of its bark. Owing to the wide area it occupies, it has come into more general use than its ally, and in Westland and Otago it has been utilized for railway sleepers with good effect, the wood having stood a considerable test as to durability. In Otago the tree is popularly known as the "Black Birch." The Tawhero blossoms in early summer, and displays quantities of erect racemes of flowers similar to the Towai, to which it is so closely allied. The bark of this species is very valuable and rich in tannin, and from it is obtained brown and red dyes, which are of commercial importance and should be extensively used. The Maoris in proceeding to obtain the dye, first bruise the bark and then boil it for a short time along with the flax to be dyed, which, when the infusion is cold, is taken out and steeped thoroughly in red swamp mud, rich in peroxide of iron; it is then removed, and dried in the sun. The dye obtained from this bark gives a very fast class of shades upon cotton, and it can be sold at the same price in the market as Gambier and Catechu. The extract is more astringent than that of the Hinau (*Elecœcarpus dentatus*) and needs only to be supplied, to be accepted by tanners, and brought into more general use.

CHAPTER XXV.

ORDER XXV.—CRASSULACEÆ. The Stone-crop Family.

CHARACTER OF THE ORDER.—Succulent plants. The New Zealand species all very small, inconspicuous herbs. Leaves usually opposite, exstipulate. Sepals 3 or more. Petals as many as the sepals. Stamens perigynous or almost hypogynous, as many as the petals, or a multiple of them. Carpels as many as the sepals, free, each often with a scale at its outer base, 1-celled; style very short, or stigma sessile; ovules few or many, attached to the suture of the carpel. Seeds minute albuminous; embryo terete.—*Handbook of the New Zealand Flora, p.* 61.

DESCRIPTION OF THE ORDER.—

ESPECIALLY abounding in South Africa, and the Southern parts of Europe, this large order embraces both succulent herbs and shrubs. Amongst the family are the House-leek, Stone-crop and *Crassula,* a well known genus giving its name to the order. Its members are found on naked rocks, old walls, or hot sandy plains, alternately exposed to the heaviest dews of night, and the fiercest rays of the noonday sun. Acridity prevails in many plants of the order. Some species are cooling in their properties, others are astringent. *Sedum acre* is very acrid, and is hence called "Wall-pepper;" it is abundant on sandy shores. *Sempervivum tectorum,* the House-leek, is so called from its growing on the tops of houses. *Bryophyllum calycinum* has the property of producing leaf buds along the margin of its leaves. There are about four hundred and seventy species, distributed among twenty-four genera, of which CRASSULA, BRYOPHYLLUM, SEDUM, SEMPERVIVUM, and PENTHORUM are examples. The order in New Zealand is represented by *Tillœa,* a genus of small, tufted, erect or procumbent herbs. The name *Crassulaceæ* is derived from the Latin word *crassus,* in allusion to the thick and succulent nature of the leaves and stems.

GENUS I.

TILLŒA. (*Micheli*). The Tillœa.

Generic Character.—Small or minute, tufted, erect or procumbent herbs. Leaves small, opposite. Flowers axillary. Sepals, petals, stamens, and carpels 3–5, the latter with or without scales at the base. Fruit of 3–5 follicles, with few or many seeds.—*Handbook of the New Zealand Flora, p.* 61.

Description, etc.—A small genus of wide distribution, comprising about twenty species, of aquatic or terrestrial herbs, which are usually pentamerous, the tetramerous species having been placed in a separate genus, *Bulliarda,* but not generally retained. *Tillœa muscosa* occurs on sandy heaths in the South of England, in Western Europe, and North Africa. The New Zealand species are (1). *T. moschata;* (2). *T. Sinclairii,* each having a scale at the base of each carpel; (3). *T. verticillaris;* (4). *T. debilis;* (6). *T. purpurata,* with no scales.

1. TILLŒA MOSCHATA. (*D.C.*) The Musk-like Tillœa.

Specific Character.—A tufted, rather succulent red-brown herb, 3–5 in. high, sparingly branched, rooting at the axils of the leaves. Leaves small, $\frac{1}{6}$–$\frac{1}{3}$ in. long, oblong spathulate or obovate-oblong, obtuse thick, quite entire. Flowers $\frac{1}{6}$–$\frac{1}{5}$ in diam., white, axillary, shortly peduncled. Sepals 4, obtuse, half as long as the oblong, obtuse petals. Stamens 4. Scales linear-cuneate. Carpels turgid, with short recurved styles, many-seeded.—*Handbook of the New Zealand Flora, p.* 61.

Description, etc.—This small herb is indigenous to the East Coast of the Northern Island, and is most frequent on moist rocks, near the sea. It is more common in the Middle Island in similar situations, and is likewise abundant at the Lord Auckland Group and Campbell Island. It is also a native of South Chili, Fuegia, the Falkland Islands and Kergeulen Land, and is one of the largest of the species.

OTHER SPECIES OF TILLŒA.

2. T. SINCLAIRII (*Hook., F.*)

A small delicate tufted pale-green plant, 1 to 2 in. high, with very slender stems. It has minute leaves, and small solitary white flowers, with scales and carpels as in *T. moschata* . It is native to the Middle Island, on the Rangitata River, at an elevation of 2000 feet.

3. T. VERTICILLARIS (*D.C.*)

A small erect, pale red-brown succulent herb, with stems 2 to 4 in. long, simple, or branched from the base. It has very small leaves, and minute flowers densely crowded in the axils of the leaves. The plant is common on dry rocky sunny places, throughout the Islands, and is also found in Australia, Tasmania, and Chili.

4. T. DEBILIS (*Col.*)

A very small, delicate species, with intricate stems, prostrate, 2 to 3 in. long. It has leaves in scattered pairs, with very minute flowers growing in the axils of the leaves. It is found on the East Coast of the Northern Island, and was first noted by Mr. Colenso, F.L.S.

5. T. PURPURATA (*Hook., F.*)

A small, delicate, tufted, pale red-brown species, with slender prostrate stem, sparingly branched, 1 to 3 in. long, and minute linear leaves. The flowers are solitary, axillary, and $\frac{1}{10}$ in. diam. This species is found on the East Coast of the Northern Island, and is also native to Southern Australia.

CHAPTER XXVI.

ORDER XXVI.—DROSERACEÆ. The Sundew Family.

CHARACTER OF THE ORDER.—All the New Zealand species but one are scapigerous herbs. Leaves covered on the upper surface, or margins, or both, with copious glandular hairs. Flowers regular, hermaphrodite. Calyx 4 or 5-partite, imbricate, persistent. Petals 4 or 5, hypogynous, rarely perigynous, generally persistent. Disk 0. Stamens 4 or 5, usually hypogynous; filaments subulate or filiform; anthers short, often bursting outwardly. Ovary superior, ovoid or globose, numerous, on parietal placentas. Capsules membranous, 1-celled, loculicidally 3-5-valved, many-seeded. Seeds small; testa lax, reticulate; albumen fleshy, copious, embryo rather large, or minute, cylindrical.—*Handbook of the New Zealand Flora, p.* 62.

DESCRIPTION OF THE ORDER—

VERY remarkable but small order, of which the prevalent characters alone are given above, and these apply to all the New Zealand species. The plants are found inhabiting marshes, in Europe, India, China, Cape of Good Hope, Madagascar, North and South America, and Australia. They have acid, and slightly acrid properties. A few northern and Cape of Good Hope genera present a shrubby habit, and other exceptions to the general character. The species are remarkable for their glandular hairs, which are covered with drops of fluid in sunshine, hence the name of "Rossolis," and of the Italian liquor Rossoli, in the preparation of which a species of DROSERA is used. Some include PARNASSIA in this order. There are seven known genera, including DROSERA, DIONÆA, DROSOPHYLLUM, and ALDROVANDA, and about one hundred species. The most remarkable plant of the order is *Dionæa muscipula* (Venus' Fly-trap), the only one of the genus *Dionæa.* It is a humble marsh plant, bearing from the root, on a smooth leafless stalk, a few inches high, a corymb of flowers. The root is composed of scales, almost like a bulb, with a few fibres, from this proceed in a radiating manner a number of leaves on longish stalks, which are winged like those of the orange tree. The lamina of the leaf itself is divided by the midrib into two nearly semi-circular halves, each of which is fringed with stiff hairs, and furnished near the middle with three minute bristles arranged in a triangle, which are extremely irritable, and when touched by a fly or other insect cause the two sides of the leaf to collapse with a sudden spring, imprisoning the intruder until it is either dead or ceases to move. Some time after all motion has ceased they open again spontaneously. It is a native of the swamps of North Carolina and Florida, but is often cultivated in English hothouses. As might be expected, the same result is produced by touching the irritable bristles with any fine pointed substance, as a pin or a bit of straw.

GENUS I.

DROSERA. (*Linn.*) The Sundew.

GENERIC CHARACTER.—Stamens 4 to 8. Styles 2 or 3, bi-partite or multifid.—*Handbook of the New Zealand Flora, p.* 63.

DESCRIPTION, ete.—An extensive genus, found in all parts of the world, but most abundant in Australia. The most striking character of the species is connected with their leaves. In Britain these all spring from the root in a radiating manner, and in their early stages are rolled up in a circinate form like the fronds of a fern. When expanded they are somewhat concave, and thickly set with glandular hairs, those nearest the edge being the longest. Each hair is tipped, especially in bright weather with a minute drop of viscid fluid, hence the name "Drosera" (from the Greek *drosos*, dew), and the English name Sundew. The hairs are not so decidedly irritable as in the allied genus *Dionæa*, but when any small fly, or other insect alights on the leaf, it is held entangled, at first by the viscid fluid, and subsequently the hairs bend over it, until decomposition has taken place. And this is no unusual occurrence, on the contrary, one can scarcely ever examine a plant without finding the wings and legs of insects, on one or more of the leaves. On this account they have been designated "Fly-catchers," or "Carnivorous Plants." The viscid fluid with which the hairs are furnished is said to be acrid and caustic, to curdle milk, and to remove warts, corns, freckles, and sunburns. It is also said to cause rot in sheep. The sanitary virtues ascribed to it may be real or imaginary; but with respect to its mischievous effect upon sheep, there can be no doubt that where Sundew grows, the flocks are not likely to fatten, for the herbage with which it is associated is mostly moss, rushes, cotton grass, and other juiceless weeds. There are three kinds of Sundew indigenous to Britain, which differ in the shape and size of their leaves, and agree in having small inconspicuous flowers on a leafless wiry scape. Some of the foreign species have leafy stems. This extremely interesting genus is represented in New Zealand by six species, all of which are said to digest meats, and are known to the settlers as "Fly-catchers." They are (1). *Drosera stenopetala,* a stemless plant with a one-flowered scape; (2). *D. arcturi,* a stemless plant with linear leaves, and a one-flowered scape; (3). *D. pygmea,* a very small stemless species, with orbicular leaves, and a one-flowered scape; (4). *D. spathulata,* stemless, with spathulate leaves, and a many-flowered scape; (5). *D. binata,* stemless, with strap-shaped leaves, and a many-flowered scape; (6). *D. auriculata,* with an erect stem, peltate leaves and a many-flowered stem.

1. DROSERA STENOPETALA (*Hook., F.*) The Narrow-petalled Drosera.

Specific Character.—Stemless. Leaves with slender glabrous petiole 1–4 in. long; blade spathulate, ⅓–⅔ in. long, densely clothed with long glandular hairs. Scape slender, longer than the leaves, 1-flowered. Flowers ½ in. diam. Calyx campanulate, 5-lobed, glabrous. Petals very narrow linear spathulate. Styles 3, multifid to the base.—*Handbook of the New Zealand Flora, p.* 63.

Description, etc.—This species is known at Port Preservation in Southland; the Nelson Mountains, at an elevation of 4,500 feet, the most northerly habitat yet recorded; Port Pegasus, Stewart Island; and the Lord Auckland group. It is abundant at Port Pegasus, and being densely clothed with long glandular hairs it is pre-eminently fitted for its destructive work. It is very nearly related to the Fuegian species *D. uniflora.*

2. DROSERA ARCTURI (*Hook.*) The Alpine Drosera.

Specific Character.—Stemless; rhizome, long, slender. Leaves 2–3 in. long, linear ligulate, or linear spathulate, covered with long glandular hairs; petiole almost as broad as the blade. Scape about as long as the leaves, one flowered. Flowers nearly ½ in. diam. Petals obovate, as long as the calyx. Styles 3 or 4, short. Stigmas capitate.—*Handbook of the New Zealand Flora, p.* 63.

Description, etc.—Fig. 1, Plate No. 33.—The "ALPINE SUNDEW."—This plant is indigenous to both Islands, in wet places on the mountains, at an altitude of from 3500 to 5000 feet. In the Northern Island it is confined to the Ruahine Mountains, where it grows close to the snow. It is also a native of the Tasmanian and Australian Alps. In its native habitat, it is reported by Mr. G. M. Thompson, (to whom science is much indebted for his study of the New Zealand *Droseraceæ,*) that it was seldom noticed by him to catch insects, attributable, as he supposes, to the fact that the plant is often submerged during wet weather. At various times interesting experiments have been made by scientific men, with a view to determine the digestive powers of the Sundews. In the experiments conducted by Dr. Darwin, the famous Naturalist, on the common English species *D. rotundifolia,* meat raw and cooked, gluten, gelatine, bone, milk, soups, etc., were all digested. Starch, fats, oils, cellulose, and other non-nitrogenized matters were not digested, and in fact produced no exciting effect on the glands, while cheese produced a vigorous attempt at digestion, apparently followed with acute dyspepsia.

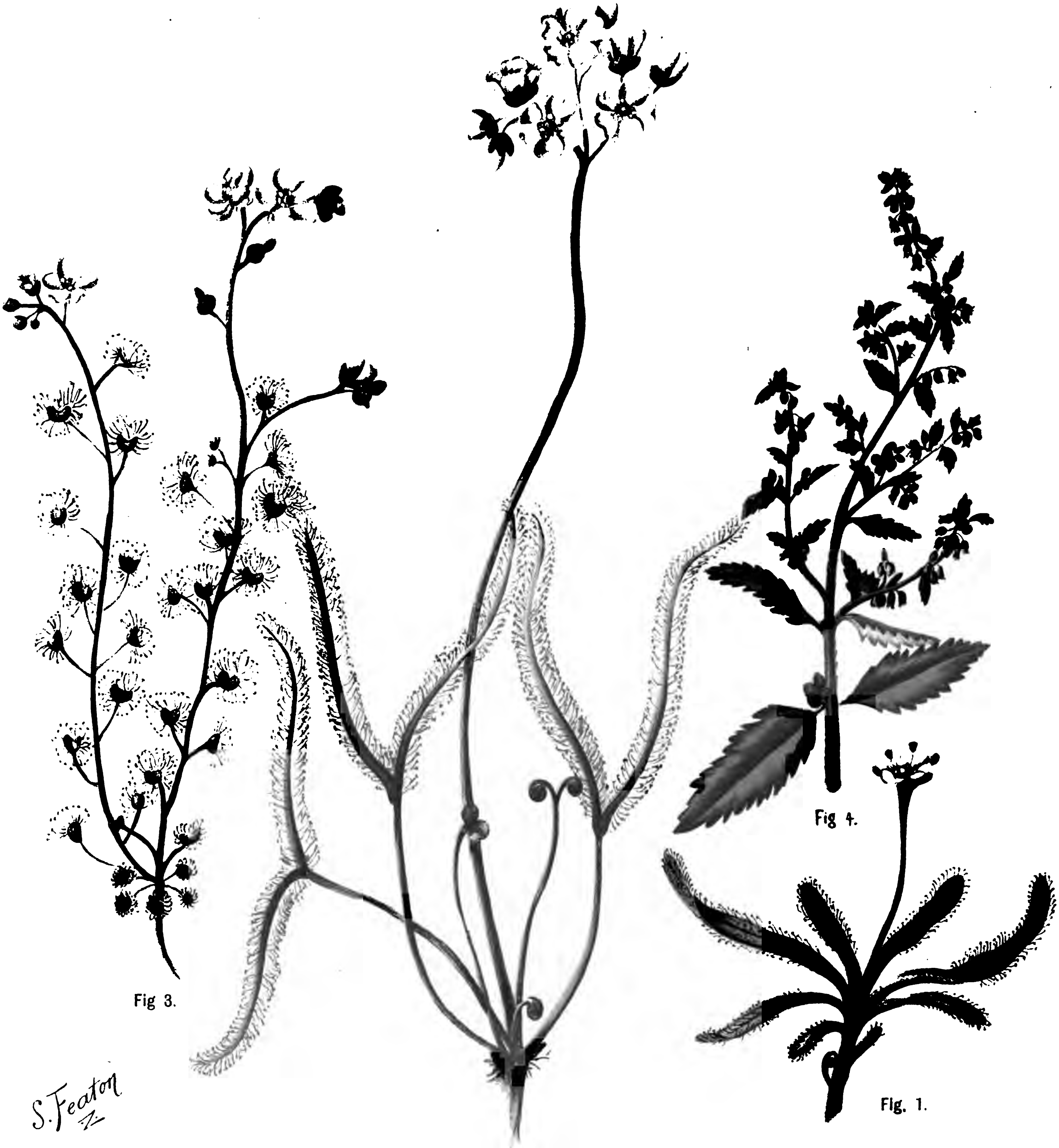


Fig 3.
Fig 4.
Fig. 1.
Fig 2.

S. Featon

COPYRIGHT.

BOCK & COUSINS, CHROMO-LITHO.

1.—DROSERA ARCTURI. 2.—DROSERA BINATA. 3.—DROSERA AURICULATA.

Our New Zealand species give similar results. The following interesting experiments were made by Mr. G. M. Thompson, F.L.S., of Otago, on *D. arcturi*, and are mentioned by him in his able paper "On the fertilization of flowering plants," contributed to the "*Transactions and Proceedings of the New Zealand Institute*," *Vol. XIII, p. 261,* he says:—"I experimented on various leaves by supplying them with small fragments of raw meat and insects. I did not weigh the portions of meat, as I was not particular as to the exact results, but selected them of various sizes, from the size of a pin's head to pieces as large as a full-sized grain of wheat. In each case the meat was seized by the tentacles (or marginal hairs) in from two to twenty-four hours, those nearest bending towards it, and by the latter time, the colour was generally bleached out of it. The process of absorption lasted from four days, to as many as eight for the larger pieces, the meat all the time, having a pearly-white appearance, and being bathed in clear liquid, which sometimes accumulated to such an extent as to run down the blade and petiole. In experiments with insects I placed four full-sized *Aphides* on each leaf, and found that on an average they were completely disposed of in about three days, usually not a trace of them remaining. Only those glands in the immediate vicinity of the insects appeared to be concerned in the process. These results were obtained on strong healthy leaves. Very young leaves seemed sickened by an overdose of meat, while older ones sometimes did not begin to act for two or three days." The digestive powers of the *Drosera* appear similar to those of the human being, and like ourselves, they sometimes suffer from dyspepsia, when treated to indigestible food.

3. DROSERA PYGMŒA (*D.C.*) The Pigmy Drosera.

SPECIFIC CHARACTER.—A very small, stemless species. Leaves densely crowded, rosulate, shortly petioled, orbicular, concave, subpeltate, ¼ in. diam. Stipules very large, scarious, forming a beautiful silvery star round the base of the scape. Scape filiform, 1 in. high. Flowers solitary, minute. Sepals 4, filiform, subclavate.—*Handbook of the New Zealand Flora, p* 63.

DESCRIPTION, etc.—This minute species is indigenous to the Northern Island in marshes at Cape Maria Van Dieman, and also in the Middle Island at the Bluff in Southland. It is also a native of the South coast of Australia, and Tasmania. The distribution of this plant in New Zealand is very peculiar, inasmuch as it has been found only in the extreme North-western part of the colony, and again in the extreme South. This Sundew was originally discovered by Mr. Colenso, F.L.S., at Cape Maria Van Dieman about fifty years ago. It is a minute plant, not more than half-an-inch across, with numerous thread-like one-flowered scapes, and from its grey tinge may easily be passed over. There can be no doubt that from its insignificance, the plant has been perhaps overlooked elsewhere in New Zealand, and is therefore accounted rare.

4. DROSERA SPATHULATA (*Labill.*) The Spathulate-leaved Drosera.

Specific Character. — Stemless. Leaves rosulate, densely crowded, ½-¾ in. long, spathulate, covered with glandular hairs. Scapes one, or several, slender, simple or bifid, 8–15 (rarely 1–2) flowered. Flowers shortly pedicelled, secund, ⅛ in. broad. Sepals united at the base. Petals spathulate, pink, red, or white, twice as large as the calyx. Styles 3, 2-partite.—*Handbook of the New Zealand Flora, p.* 63.

Description, etc.—Found throughout the Islands in wet places, but not very common; ascending to 5000 feet on the shingly banks of Lakes Wanaka and Hawea in the Otago district. It is a common Australian plant, and occurs in the Philippine Islands. Like *D. arcturi* it is a very low growing plant, and in wet weather is frequently submerged. In dry weather, however, it indulges its carnivorous appetite to the fullest, and is often seen with insects adhering to its leaves, the bright red colour of which probably attracting them. The leaves are very small and have not such powerful tentacles as *D. arcturi,* but the blades are broader, and when bent, form a more perfect cup than those of the other species. Experiments on this plant show that its digestive powers are proportionately active. The flowers vary in colour from white to pink and red, and are fairly large when we consider the size of the plant.

5. DROSERA BINATA (*Labill.*) The Binate-leaved Drosera.

Specific Character.—Stemless. Leaves on slender petioles, 2–4 in. long. Blade divided into two linear, strap-shaped, simple or 2-fid, divaricating lobes, 2–4 in. long, covered with glandular hairs. Scapes 8–12 in. high, very slender, glabrous, bearing a branched 6–8 flowered cyme. Flowers, white, ¼-½ in. diam., on slender pedicels. Petals menbranous, obcordate, twice as long as the glabrous, or ciliate sepals. Styles 3, penicillate.—*Handbook of the New Zealand Flora, p.* 64.

Description, etc.—Fig. 2, Plate No. 33.—The "STRAP-LEAVED SUNDEW."—This very handsome plant is found in bogs and damp places throughout the Islands, and is abundant in Australia and Tasmania. It was first noticed by Banks and Solander, the naturalists, on their visit to these shores in 1769. Its leaves are quite different in form from the spathulate-leaved species, but they are equally as active in their power of absorbing nitrogenous materials. In the native state this plant almost always has insects, seeds, etc., adhering to its tentacles, and this may be chiefly due to its erect habit, and bright red colour. In the Northern Island it blooms in the months of September and October, when its handsome display of white flowers render it easy of observation to the field botanist. The plant is popularly known as "Old Man's Eyebrow." Under examination in the sunlight, the glandular hairs (tentacles) present a beautiful appearance, each hair being of a transparent ruby colour, tipped with a minute crystal globule which reflects all the prismatic colours of the rainbow, looking like clusters of brilliant gems, corruscating in the light. Under the microscope this beautiful imagery is even more fully intensified, and forms a most attractive subject. It is noticeable that the plants of the Sundew family, have very small roots, and are more or less aquatic in their habits. Most of them have lost to a greater or lesser extent their power of decomposing the carbonic acid of the air, so that they must depend for nourishment very largely on the supplies which they can catch by their leaves. To accommodate them to the situations, nature has given these plants facilities and corresponding advantages whereby they can first attract their victims, and then secure them for sustenance.

6. DROSERA AURICULATA *(Backhouse).* The Ear-shaped-leaved Drosera.

Specific Character.—Stem erect, simple or sparingly branched, 6–18 in. high, flexuose, glabrous, leafy, arising from a small coated tuber. Leaves peltate, lowest rosulate, orbicular, ¼ in. diam., on short flattened petioles, upper alternate, rather larger, lunate, on filiform petioles ½–1 in. long; all copiously studded towards the margin with very long glandular hairs. Flowers 3–8, on slender pedicels, white or lilac, ¼–⅓ in. diam. Sepals oblong, obtuse, often jagged. Petals three times longer than the sepals, obovate, or obcordate. Styles, 3, penicillate below the middle.—*Handbook of the New Zealand Flora, p. 64.*

Description, etc.—Fig. 3, Plate No. 33.—The "FIELD SUNDEW."—This interesting species is not uncommon in dry soils throughout both Islands, where it is often found climbing by its glandular leaves amongst the ferns and grass. It is a common Australian and Tasmanian plant, and is also found in Norfolk Island. This species blooms in September and October, and is much admired for its large pink flowers. In its native state, its carnivorous properties are fully evidenced by the fragmentary remains of insects which adhere to its leaves. The plant may fairly be deemed a terrible destroyer of insect life, for each leaf is a trap of the most attractive description, easily excited into action, and temptingly baited with its seductive fluid. Woe to the unfortunate *Aphide,* or unwary fly that may venture within its portals; for once within, all hope of release must for ever be abandoned. The slightest touch causes the tentacles of the leaf to close, but no amount of blowing or shaking will urge them to act. This species, when examined in sunlight is indeed very beautiful, even more so than *D. binata.* The leaf is a translucent green, fringed with ruby-coloured hairs, tipped with crystal globular shaped prisms. Under inspection by artificial light, the appearance of the leaves is charmingly intensified. Words are almost inadequate to describe the beauty of the transparent green floor of the leaf studded with rubies, and overhung with pale ruby lashes, tipped with crystals, bright with the reflected colours of the diamond, the emerald, and the ruby. Enlarged under magnifying power, each leaf appears like a terrible but beautiful monster. The reality of its nature is displayed by the remains of its victims, which strew the floor of this lovely charnel house. It may be interesting to some of our readers to know that there is no difficulty in cultivating the Sundews as window plants, where they may the more immediately come under observation. We have ourselves kept *D. auriculata* potted for a length of time, without the least trouble. If the plants are carefully taken up with the surrounding earth, being careful not to expose the roots, they can be placed in a pot or dish, and by keeping them constantly moist, they will thrive and admit of study and examination equally as well as if they were growing in their native state.

CHAPTER XXVII.

ORDER XXVII.—HALORAGEÆ. The Haloragis Family.

CHARACTER OF THE ORDER.—Herbaceous, terrestrial or aquatic plants. Leaves opposite, alternate, or whorled, exstipulate. Flowers small, often very inconspicuous, variously arranged, hermaphrodite or unisexual, usually regular. Calyx-tube adnate with the ovary; Limb 0 or 2–4-lobed, or toothed. Stamens 2–4 (rarely one) epigynous. Ovary inferior, usually 4-(rarely one)-celled, with 2–4 (rarely one) short conical styles, or as many sessile, plumose or papillose stigmas, or with 1–4 long, subulate stigmatiferous styles. Ovules solitary, pendulous in each cell. Fruit small, indehiscent, 4-celled, and-seeded, or breaking up into 2–4 carpels, or a 1-celled small drupe. Seeds pendulous; testa membranous; albumen fleshy; embryo minute, ovoid or long and terete.—*Handbook of the New Zealand Flora, p.* 64.

DESCRIPTION OF THE ORDER.—

SMALL order of dissimilar plants scattered all over the world. The genus *Callitriche* included here is a very doubtful member. *Balanophoreæ,* an order closely allied to *Halorageæ* will be found amongst *Incompletæ.* The plants are found on dry hills, or in damp places, ditches, and slow streams, sometimes submerged. There are four genera in New Zealand, viz.:—(1). HALORAGIS, terrestrial plants; (2). MYRIOPHYLLUM, aquatic plants; (3). GUNNERA, marsh plants; and (4). CALLITRICHE, marsh and aquatic plants.

GENUS I.

HALORAGIS (*Forst.*) The Haloragis.

GENERIC DESCRIPTION.—Erect, procumbent, or creeping herbaceous plants. Leaves opposite or rarely alternate toothed, rarely lobed, or pinnatifid. Flowers axillary, minute, hermaphrodite, or unisexual, sometimes racemose at the ends of the branches, pendulous. Calyx-tube terete, 4–8 angled or winged; lobes 4, erect, acute, persistent valvate. Petals 4, small, concave, deciduous, coriaceous. Stamens 4 or 8, usually with short filaments and large linear, or oblong anthers, bursting laterally. Ovary 2 or 4-celled; stigmas 2 or 4, sessile, plumose or simple. Fruit, a dry, coriaceous, or somewhat drupaceous, 4–8 angled, or winged, 2–4-celled nut. Seeds pendulous; embryo terete.—*Handbook of the New Zealand Fora, p.* 65.

DESCRIPTION, etc.—A genus almost confined to tropical Asia, Australia, and New Zealand, and more particularly abundant in the latter Countries. One New Zealand species is also found at Juan Fernandez. The New Zealand species, all of which are terrestrial, consist of (1.) *Haloragis alata;* (2.) *H. tetragyna;* (3.) *H. depressa;* (4.) *H. micrantha;* (5.) *H. aggregata.*

1. HALORAGIS ALATA *(Jacq.)* The Wing-seeded Haloragis.

Specific Character.—Stem herbaceous, erect or procumbent at the base, branched 4-angled, 1–3 ft. high; branches sub-erect, slightly scabrid. Leaves opposite, sessile or petioled, ovate-lanceolate, acute or obtuse, very coarsely deeply serrate, coriaceous, slightly rough to the touch, $\frac{1}{2}$–$1\frac{1}{2}$ in. long. Flowers minute, green, in leafy, slender terminal racemes, solitary or whorled, on short curved pedicels, drooping, $\frac{1}{12}$ in. long. Calyx 4-angled, with 4 small lobes. Petals twice as long as the calyx lobes. Nut small, with 4 narrow wings, green; sides smooth or wrinkled. Stigmas conical, not plumose.—*Handbook of the New Zealand Flora, p,* 65.

Description, etc.—This plant is abundant on dry hills in various localities throughout the Islands, and ascends to an elevation of 2,000 feet. It was first noticed by Banks and Solander, the great naturalists, when they visited these Islands in company with Captain Cook. The plant is also found in the island of Juan Fernandez. The Maoris know it by the name of "Toa-toa."

OTHER SPECIES OF HALORAGIS.

2. H. TETRAGYNA *(Labill.)*

A sub-erect or prostrate slender branched herb, everywhere scabrid, with short, hispid pubescence, branches slender, 2 to 8 inches long. Leaves all opposite, shortly petioled. Flowers minute, sessile, solitary, in the axils of the upper leaves. Nut ovoid, $\frac{1}{12}$ of an inch long, 8-angled, muricate; stigmas plumose. There are two varieties of this plant, shewing slight differences to the above description. This species is common on dry hills in the Northern Island. It is also a native of Tasmania, Southern Australia, China, Borneo, and the mountains of Eastern Bengal.

3. H. DEPRESSA (*Hook., F.*)

A very slender prostrate branched herb, slightly scabrid, with short white hairs; branches 1 to 12 inches long, wiry, almost thread-like. Leaves sessile, broadly ovate, sub-acute, $\frac{1}{4}$ to $\frac{1}{3}$ inches long, with 3 to 5 deep close serratures on each side. Flowers solitary, axillary or sub-terminal, sessile. Nut $\frac{1}{8}$ inch long, 4-angled or obscurely 4 to 8 costate, smooth or wrinkled, but not muricate; stigmas plumose. This species is likewise common on dry hills, and is found throughout the Islands. It is readily distinguished from *H. tetragyna* by being almost glabrous, and very slender. Sir J. D. Hooker observes that "this is the same as the Tasmanian *H. serpyllifolius,* or it is most closely allied to it, but the fruit is larger in the New Zealand plant."

4. H. MICRANTHA (*Brown.*)

A small, slender tufted, perfectly glabrous plant, stems and branches thread-like, ascending or erect, 2 to 6 inches high, running out into leafless racemes. Leaves few, small, and all opposite, sub-sessile, broadly ovate, sub-acute, with very few shallow crenatures on each side, glabrous. Flowers few, very minute, scattered along the marked filiform tips of the branches. Nuts minute, oblong 8-ribbed; stigmas plumose. This species is common in rather moist places in various parts of the Northern but rare in the Middle Island. It is common, however, in Tasmania, Southern Australia, the Eastern Himalaya, hilly parts of East Bengal, and in Japan. This is the *Goniocarpus citriodours* of A. Cunningham, which was accredited by him as possessing a smell as of lemons. Sir J. D. Hooker, however, takes exception to this and supposes that the aroma detected by Mr. Cunningham was due to his having dried his plant specimens with *Micromeria*, herbs which have an odour like common thyme.

5. H. AGGREGATA (*Buchanan.*)

This plant is a slender, much branched herb, procumbent at the base, with branches very narrow, erect, 4-angled, 4 to 5 inches high, and scabrid. Its leaves are $\frac{1}{4}$ to $\frac{1}{2}$ an inch long, opposite, distant, acute, tapering into a short petiole. The flowers are hermaphrodite, in pairs collected at the ends of the branches. This addition differs much from any of the described species, either in New Zealand or Australia. The specific name has been chosen to indicate the most prominent character of the plant, the aggregating of the heads. It was first collected by Mr. H. H. Travers, near Lake Guyon, in the Nelson district, in 1871, and is fully described by Mr. John Buchanan, and illustrated in his paper on " Some new species of New Zealand plants,"—" *Transactions and Proceedings of the New Zealand Institute,*" for the year 1871.

GENUS II.

MYRIOPHYLLUM. (*Vaillant.*) The Water Milfoils.

Generic Character.—Water or marsh plants, with slender, terete, sparingly-branched stems. Leaves usually whorled, entire, toothed, or pinnatifid, the submerged often capillaceo-multifid, the uppermost more entire, often opposite, or alternate. Flowers small, in the axils of the upper leaves, almost sessile, uni- or bisexual. Calyx-tube in the male none, in the female ovoid, or 4-gonous, limb 4-toothed, or truncate. Petals, none in the female flower, in the male 4, membranous, deciduous. Stamens 4 to 8, filaments short; anthers linear. Ovary 4-celled; styles 4, very short, or none; stigmas often plumose. Fruit usually separating into 4 small, hard, indehiscent, 1-seeded nuts; testa membranous; albumen fleshy; embryo terete. — *Handbook of the New Zealand Flora, p.* 66.

Description.—A very widely diffused genus in both temperate and tropical regions. The species have wide ranges in their several zones, but those of the southern regions are hardly the same as the northern. The foliage is very variable; the upper leaves in the two first New Zealand species, are sometimes as much divided as the lower. There are fifteen species, distributed throughout the world. The flowers are small, and inconspicuous. The leaves are feathery, or pectinate, opposite, alternate, or whorled. There are three British species, which are called "Water Milfoil"; they are generally distributed, the commonest being *M. spicatum.* The New Zealand species are—(1.) *M. elatinoides,* (2) *M. variefolium,* (3) *M. robustum,* (4) *M. pedunculatum.*

1, MYRIOPHYLLUM ELATINOIDES. (*Gaudichaud.*) The Native Water Milfoil.

Specific Character.—Stems 6in. to 3ft., long, depending on the depth of the water. Leaves whorled, usually 4-nate, the lower pectinately pinnatifid, 1–2 in. long, the upper much smaller, sessile, oblong, obtuse, serrate. Flowers small, white; female with two linear centre, or serrate bracts. Stigmas plumose. Fruit of 4 minute, oblong, terete, smooth nuts.—*Handbook of the New Zealand Flora, p.* 66.

Description, etc.—This species is found in still water throughout both Islands, ascending to a height of 3,000 feet above sea level. It is also abundant in Tasmania, Australia, and the lakes of the Cordillera from the Equator to Chili, and the Falkland Islands.

OTHER SPECIES OF MYRIOPHYLLUM.

2. M. VARIÆFOLIUM. (*Hook., F.*)

This plant has the same habit as the preceding, but its leaves are in whorls of five to seven, the lower multifid, or pectinate-pinnatifid, the upper very narrow, linear. Flowers and fruit very small. Common in still water throughout the Islands as far south as Canterbury. It is also found in Tasmania, Australia, and South America.

3. M. ROBUSTUM. (*Hook., F.*)

A species with robust stems, and leaves one to two inches long, with five to seven in a whorl, all pectinately-pinnatifid. Flowers and nuts much larger than in the preceding species. A robust plant, with fruit as large as in the Indian *M. tuberculatum,* but the nuts are more rounded, and the foliage is coarser and crowded. It much resembles in some states, the European *M. verticillatum.* It has not been recognised amongst the Australian or American species.

4. M. PEDUNCULATUM. (*Hook., F.*)

This is a small species, with erect stem, slender, simple, or sparingly branched, two to four inches high. Leaves opposite, narrow, linear, quite entire, or obscurely toothed, one-eighth to one-third of an inch long. Flowers minute. Nuts ovoid, somewhat wrinkled. It is peculiar to the Middle Island, and is found in moist places on the Canterbury Plains. It is found also in Tasmania, and Victoria, where the leaves become broad and flat.

GENUS. III.

GUNNERA. (*Linn.*) The Gunnera.

Generic Character.—Stemless herbs, usually growing in swamps or boggy places, with stout or slender creeping, or subterranean rhizomes. Leaves petioled, radical. Scapes bearing small racemose or panicled, uni-sexual, rarely bi-sexual flowers. Male flower—Sepals 2 or 3; petals 2 or 3, or none; stamens 2 or 3, opposite the petals, filaments slender; anthers large, often tetragonous. Female flower—Calyx-tube ovoid, lobes 2 or 3, often toothed; petals 2 or 3 or none; Stamens none; ovary 1-celled; styles usually 2, linear subulate, or filiform, covered with stigmatic papillæ; ovule solitary, pendulous. Fruit a small rather fleshy drupe. Seed filling the cavity of the drupe to the walls, of which the membranous testa often adheres; albumen fleshy and oily; embryo very minute, broadly pyriform, or cordate.—*Handbook of the New Zealand Flora, p.* 67.

Description, etc.—This is an almost exclusive southern genus, scattered over the Australian, Malayan, New Zealand, Pacific, and South American Islands; it is also found in South Africa, and in the Andes, as far north as the Gulf of Mexico. The Chilian species is noted for its immense leaves, sometimes six feet across. The New Zealand species have long filiform styles, but no petals, they are—(1.) *G. monoica*, (2.) *G. densiflora*, (3.) *G. prorepens*. The name of the order was given by Linneus in honour of Ernest Gunner, a Bishop of Norway, who published a Flora of that country. There are eleven known species, natives of various countries. Two of them, *G. scabra* and *G. manicata*, are known in gardens by their coarse, rough, rhubarb-like lobed leaves, and singular elongated conical inflorescence.

1. GUNNERA MONOICA (*Raoul.*) The Matted Gunnera.

Specific Character.—Glabrous or minutely hairy; rhizome creeping, tufted herbs forming matted patches. Leaves reniform, or orbicular, $\frac{1}{3}$–$\frac{2}{3}$ in. diam., lobed and crenate, or crenate only, both surfaces glabrous, or covered with scattered small hairs, petiole $\frac{1}{2}$–2in. long, pilose, rarely glabrous. Panicle longer, or shorter than the leaves, very slender, branched, rarely simple, flowers sparse, males with long filaments; bracts and calyx-lobes ciliate, rarely entire. Drupes very small, ovoid, about $\frac{1}{12}$in. long.—*Handbook of the New Zealand Flora, p.* 67.

Description, etc.—This plant is peculiar to both Islands, and is found in moist shady places; it was first discovered by Banks and Solander in the year 1769.

OTHER SPECIES OF GUNNERA.

2. G. DENSIFLORA. (*Hook., F.*)

This species is similar to *G. monoica* but the leaves are never lobed, though minutely and sharply toothed, the peduncles stout, flowers spiked, crowded, filaments short, and drupes larger, oblong and pendulous. It is found on the Acheron and Clarence Rivers in the Middle Island at an elevation of 4000 feet.

3. G. PROREPENS. (*Hook., F.*)

Usually much larger than the two preceding species, often one foot high, but sometimes small. Leaves ovate or oblong, rounded at the top, rounded or cordate at the base, crenulate, ½ to 2 inches long. Petiole 1 to 8 inches long. Peduncle stout, as long as the petiole. Flowers spicate. Drupes sessile. The plant is found in the Northern Island in sub-alpine wet localities and on the West Coast of the Middle Island. There is a variety also which is likewise known in the Middle Island on the mountains, and also in parts of the Northern. It would appear that the "Editor of the Handbook," recognises a fourth species from the base of Tongariro, with the leaves of *G. densiflora*, and fruit of *G. monoica* but the specimen was too imperfect for description.

GENUS IV.

CALLITRICHE. (*Linn.*)

Generic Character.—Small, branched, glabrous, delicate aquatic or marsh plants. Leaves opposite, linear or spathulate, membranous, quite entire. Flowers minute, solitary, rarely 2 together, axillary, sessile, or very shortly peduncled. Male flower: Bracts none or 2, deciduous, narrow-oblong, membranous, curved. Perianth none, stamen 1, filament capillary; anther 2-celled, bursting by lateral slits, which become confluent above, assuming a horse-shoe form. Female flower: Bracts as in the male or none. Perianth (if any) adherent to the ovary, which consists of 4 laterally compressed 1 celled carpels; Styles 2, filiform, papillose all over; Ovule 1 in each cell, pendulous; fruit 4 minute, flattened, keeled or winged carpels. Seed oblong or cylindric; testa membranous; albumen fleshy, embryo small, terete.—*Handbook of the New Zealand Flora*, p 68.

Description, etc.—A small genus of doubtful affinity, found in all parts of the of the temperate world. *C. aquatica* is common in ponds and still waters in Britain, often floating over them in large masses, and is found in most parts of the world. It varies much in its leaves, either all narrow, and submerged, or more frequently the upper ones floating. The most common form in the British Islands is that called *C. verna*. The genus consists of small herbaceous plants, growing in ponds and streamlets, usually immersed, but becoming more luxuriant in habit, and producing much more seed when growing out of the water. The plants are natives of Europe and South America, and are interesting from a botanical point of view, on account of their singular structure in the reproductive organs. The sole representation of the genus in New Zealand is *C. verna*, which is identical with the common British plant of that name.

1. CALLITRICHE VERNA (*Linn.*) The Native Callitriche.

Specific Character.—Stems 5–10in. long in water, shorter when growing on damp soil. Leaves ⅙–⅔in. long, obtuse 3-nerved, orbicular spathulate, or linear obovate. Male and female flowers sometimes collateral on the same pedicel. Carpels narrowly winged at the back.—*Handbook of the New Zealand Flora*, p. 68.

Description, etc.—This plant is common in wet soil, and moist places throughout the Islands, in Lord Auckland Group, and at Campbell Island. It is also abundant in the Antarctic and Northern and Southern temperate regions, and identical with the common form in the British Isles.

CHAPTER XXVIII.

ORDER XXVIII.—MYRTACEÆ. The Myrtle Family.

CHARACTER OF THE ORDER.—Shrubs or trees, sometimes subscandent. Leaves opposite or alternate, exstipulate, quite entire, furnished with pellucid glands full of volatile fragrant oil. Flowers hermaphrodite, regular, solitary or in axillary or terminal racemes, or cymose panicles, often showy. Calyx-tube adnate with the ovary, oblong, or obconic, sometimes produced beyond the ovary, limb 4 or 5 cleft, deciduous or persistent. Petals 4 or 5, orbicular, concave, sessile, imbricate. Stamens very numerous in the New Zealand genera, filaments short or long, incurved in bud; anthers small, didymous. Ovary inferior, usually 4–5 celled. Style slender or short, simple. Stigma simple or capitate; ovules numerous, on projecting placentas. Fruit dry or succulent, indehiscent, or capsular, 1 or more celled, 1 or more seeded. Seeds very various, ex-albuminous; embryo straight or curved.—***Handbook of the New Zealand Flora*, p.** 69.

DESCRIPTION OF THE ORDER—

A LARGE Order, especially in the tropics, but rare in the north temperate zone. It is represented in Europe by the Myrtle alone, but is common in the south temperate zone, where one species advances to Cape Horn, and another to Campbell Island. Many of the species yield an aromatic volatile oil, particularly those having pellucid dots on their leaves. Some yield edible fruits; others furnish astringent and saccharine matter. The leaves of *Melaleuca minor*, a native of the Mollucas, yield the volatile oil of Cajeput. Pimento or Allspice is the berried fruit of *Eugenia pimenta*, a tree of the West Indies and Mexico. The flower buds of *Caryophyllus aromaticus*, a tree which was originally a native of the Moluccas, but is now cultivated in the East and West Indies, constitute the cloves of commerce. The species of *Eucalyptus* are the gigantic gum trees of Australia, some of which attain a height of 200 feet. Guavas are produced by species of *Psidium*. *Punica Granatum* yields the pomegranate. There are about 100 genera, and 1,500 species in this Order. The name Myrtaceæ is taken from *Myrtus*, the typical genus, the species of which are widely scattered *M. communis*, the Common Myrtle, is well known by its shining evergreen leaves, and white sweet-scented flowers. It is not indigenous to Europe, but only naturalised, having originally been brought from Western Asia, where at the present day it is found in a wild state as far east as Afghanistan. In England it is not sufficiently hardy to withstand the frost of a very severe winter, except in the extreme southern parts. Amongst the ancients the Myrtle was held sacred to Venus, and was a plant of considerable importance, wreaths of it being worn by the Athenian magistrates, by the victors in the Olympian games, and by others; besides which, various parts were used in medicine, in cookery, and by the Tuscans in the preparation of Myrtle wine, called "Myrtidanum" for which purpose it is still employed. In modern times its chief use is in perfumery. The fruits, which have a sweet powerful aromatic taste, are eaten in a fresh state, or dried and eaten as a condiment. The wood is of great hardness and beautifully mottled or veined, but from its small size it is only useful for turnery. The order is represented in New Zealand by four beautiful genera, viz.:—(1.) **Leptospermum**, shrubs or trees with alternate leaves and solitary, or fascicled flowers; (2.) **Metrosideros**, erect, or subscandent trees or large shrubs, with opposite leaves and cymes of white, pink, or scarlet flowers; (3.) **Myrtus**, trees or shrubs with evergreen opposite leaves and white, or pale pink flowers, usually solitary; (4.) **Eugenia**, with leaves and flowers almost identical with Myrtus.

GENUS I.

LEPTOSPERMUM. *(Forst.)* The Leptospermum.

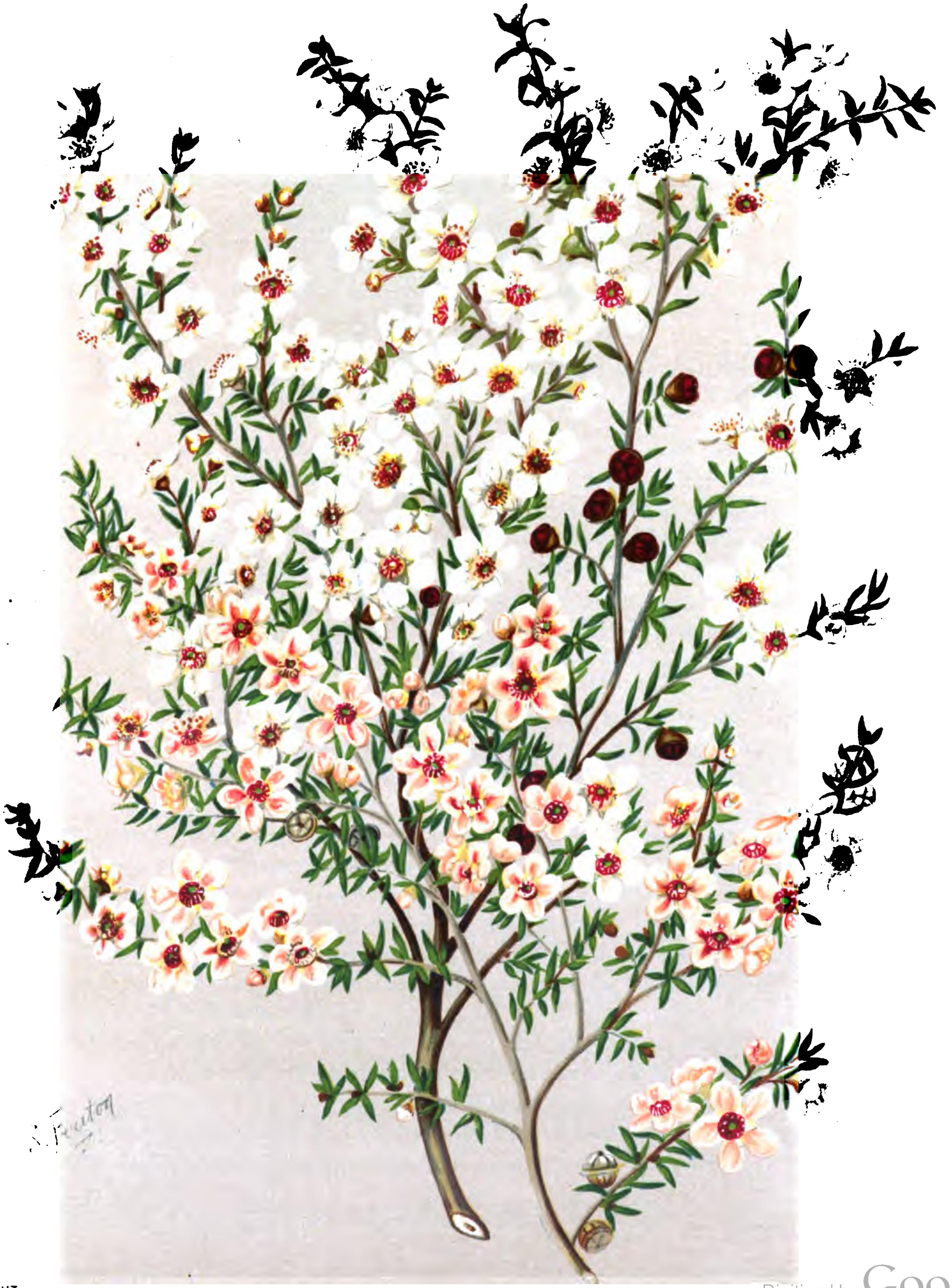
Generic Character.—Shrubs or treees. Leaves alternate, small, evergreen, coriaceous. Flowers solitary or fascicled, shortly peduncled, white or pink. Calyx-tube, turbinate, lobes 5, often persistent, valvate. Petals 5, rounded, concave. Stamens numerous, filaments short. Ovary 4 or 5-celled; style straight; ovules very numerous. Capsule coriaceous, or woody, broadly hemispherical, bursting within the calyx-border by 4 or 5 valves. Seeds very numerous, small, linear, pendulous from the inner upper angle of the cell, testa membranous.—*Handbook of the New Zealand Flora, p.* 69.

Description, etc.—A very large genus found in Australia and New Zealand, extending northwards to the Malayan Islands, with alternate, small, leathery leaves, and full of dots or cells containing oil. Their flowers are borne on short stalks on the sides of the young branches, either solitary or in little clusters. *L. lanigerum*, a native of Tasmania, and South Eastern Australia, is commonly called Tea-tree on account of its leaves having been used by the early settlers there as a substitute for tea. It sometimes forms a tree thirty feet high, with a trunk four or five feet in circumference, but in mountainous situations it is only a shrub, a few feet in height. Its straight stems were used by the Australian aborigines, for making their spears, being sharpened with a flint and hardened by means of fire. The New Zealand species are:—(1.) *L. scoparium*, a large bush or small tree, with pungent leaves and solitary sessile flowers: (2.) *L. ericoides*, a large shrub or tree, with leaves not pungent, and fascicled flowers. The former (*L. scoparium*), has four known varieties, with varied foliage, three being erect in growth, and one of a prostrate form. The name of the genus is due to the slender, or narrow seeds, which it possesses.

1. LEPTOSPERMUM SCOPARIUM. *(Forst.)* The Broom-like Leptospermum.

SPECIFIC CHARACTER.—A large bush or small tree; trunk erect; branches fastigiate, prostrate in Alpine localities, young branches and leaves silky. Leaves very variable, ¼–⅔ in. long, sessile, from linear-lanceolate to orbicular, acuminate, rigid, pungent, concave, veinless, dotted, patent, or recurved. Flowers sessile, solitary, axillary, or terminal, ¼–¾ in. diam. Calyx-tube broadly turbinate, lobes orbicular, clawed, crumpled. Capsule woody, turbinate, half sunk in the calyx-tube; the free portion 5-vaved.—*Handbook of the New Zealand Flora, p.* 69.

DESCRIPTION, etc.—Fig. 1, Plate No. 34.—The "MANUKA," or "TEA-TREE."—This well-known plant is abundant in both Islands, it is perhaps best known in the bush form, covering thousands of acres in many districts. Its presence indicates rather a poor class of soil, and the smaller the growth the poorer the soil. This species rarely attains the dimensions of a tree, usually occurring as a shrub one to fifteen feet high, but occasionally forms a trunk from twelve to eighteen inches in diameter, affording a deep red timber, inferior in strength and durability to its ally, *L. ericoides*. For domestic use the Manuka is in considerable request in the out settlements, bunches of it tied together furnishes a first-class besom, whilst its straight flexible stems are valuable for interlaced fence work, and frame work of many descriptions. The Maoris employ it for numerous purposes, in their domestic economies, as it is always handy, plentiful, and possessed of strength sufficient to be of service to them in a dozen ways, from the construction of a fishing spear, to the fencing in of their garden plots, and pig pens. A manna exudation is peculiar to this species, called "Pia-manuka," which from its emollient character, should be useful in the treatment of scalds and burns. The plant blossoms very nearly all the year round in the warmer localities. And, though it be so common, upon close inspection, one cannot fail to see, when covered with its beautiful flowers, that it is charmingly pretty. The flowers are mostly white, but some are tinged more or less with pink towards their centres. In some localities, bushes are found bearing rose pink flowers. These are however, rare, and may be attributed to the peculiar soil or conditions under which they grow. It is affirmed that seed gathered from this coloured sort, and planted in fresh situations will not give similarity in colour of blossoms to the parent bush, but cuttings will ensure it. Our plate affords a pleasing view of both the common and coloured forms, and it perhaps may be said with truthfulness, that the Manuka is equal in floral display to many highly-prized garden shrubs.



COPYRIGHT

BECK & COUSINS, CHROMO-LITHO.

MANUKA—Leptospermum Scoparium.

There are four known varieties, three of which are erect, with slightly different foliage, the fourth is a prostrate form with ascending branches, and ovate orbicular leaves and recurved edges.

2. LEPTOSPERMUM ERICOIDES. (*A. Rich.*) The Heath-like leaved Leptospermum.

Generic Description.—A large, erect shrub or tree, 10–40 feet high, similar to *L. scoparium*, but with more slender, glabrous branches; narrower, less coriaceous, acute, not pungent leaves, which are fascicled and erect, or recurved; pedicelled, smaller flowers, and the smaller capsule immersed in the calyx-tube.—*Handbook of the New Zealand Flora, p.* 70.

Description, etc.—The "KAHIKATOA."—This useful and beautiful species is abundant throughout both Islands, and ascends from sea level to 2000 feet and upwards. It attains a height of forty to fifty feet with a trunk fifteen to thirty feet in length, and one to two feet in diameter. The wood is of a reddish colour, hard, dense, and is much used for house blocks, fencing rails, and especially valued for small wharf piles. The timber has been largely used throughout the colony for piles in the construction of jetties, wharves, etc. It exhibits greater durability in marine structures, than when utilised for land or fresh water bridges. House blocks, even in dry situations, rarely continue in good condition for more than ten years. Used for land piles it usually decays at the ground level in six years, although that part of the pile above ground may remain perfectly sound. On the other hand, piles in marine works, have remained sound after twenty years' use, which is generally admitted may be taken as the average limit of its durability under the most favourable circumstances. In many cases however, it has shewn the ravages of *teredo* within two years, and been seriously injured in less than four. It is affirmed that if the piles are cut during the growing season, they will resist the attacks of the worm much longer than those cut in winter. In the Auckland district, it is generally used for fencing rails, for which it is considered superior to all other woods. As firewood it is held in great esteem, and a considerable sum has been realised, for many years past, in its sale. In some parts the "Kahikitoa," or "Rawiri," as the tree is otherwise called by the Maoris, covers entire ranges, and its graceful foliage is very striking. It blossoms in early summer, but its white flowers are not nearly so large, or so plentifully displayed as those of its close ally, the Manuka. The Maoris make spears, canoe paddles, instruments of warfare, and articles of utility out of this wood, upon which they display great taste in carving, and inlaying with the Mother of Pearl of the "Paua" shell.

GENUS II.

METROSIDEROS. (*Brown.*) The Metrosideros.

Generic Character.—Erect or subscandent trees, or large shrubs, often embracing the trunks of forest trees and strangling them. Leaves opposite, sometimes distichous, coriaceous. Flowers in terminal or axillary racemes or cymes, white, pink, or scarlet. Calyx-tube globose, oblong or turbinate, sometimes produced into a tubular or campanulate limb; lobes 5, concave, imbricate. Petals 5. Stamens very numerous; filaments filiform. Ovary 3-celled; style slender; ovules very numerous, linear, radiating outwards from tumid axile placentas. Capsule coriaceous, sunk deeply in the calyx, or its tip free, 3-celled, 3-valved, bursting usually loculicidally, rarely irregularly. Seeds very numerous, densely packed, linear; testa membranous.—*Handbook of the New Zealand Flora, p.* 70.

Description, etc.—A comparatively small genus, consisting of several Pacific Island species, ten New Zealand, an Indian, and a South African one. Its total absence in Australia, "is" says the talented Editor of the *Handbook,* "a most remarkable fact." Several species of this genus are noticeable on account of their climbing habit, all the other plants of the order being erect trees. New Zealand is well represented by the following beautiful species:—(1.) *M. florida,* a lofty climber; (2.) *M. lucida,* a small erect evergreen tree; (3.) *M. albiflora,* a lofty climber; (4.) *M. diffusa,* a large scandent shrub; (5.) *M. hypericifolia,* a large rambling, climbing shrub; (7.) *M. robusta,* a tall erect tree, or epiphytic bush with aerial roots; (8.) *M. tomentosa,* a short, stout, much branched tree; (9.) *M. polymorpha,* a small branching tree; (10.) *M. scandens,* a large climbing shrub, or small tree; and (11.) *M. Parkinsonii,* a robust climbing shrub.

1. METROSIDEROS FLORIDA. (*Smith.*) The Florid, or Showy-flowered Metrosideros.

Specific Character.—A lofty climber. Trunk very stout; branches and branchlets terete, glabrous, or puberulous. Leaves 1–3 in. long, on short petioles, elliptic-oblong, obtuse, coriaceous, glabrous; midrib stout; nerves numerous, slender, parallel, nearly horizontal. Flowers with the stamens 1 in. long, collected into terminal, branching, few or many-flowered cymes; peduncles and pedicels short and thick. Calyx obconic or turbinate, costate, glabrous, produced beyond the ovary into an obconic cup. Petals orbicular, pale pink. Stamens scarlet, numerous, and style stout. Ovary wholly adnate with the base of the calyx-tube. Capsule thick, almost woody, urceolate, with 5 stout ribs, the lobes finally deciduous. —*Handbook of the New Zealand Flora, p.* 71.

Description, etc.—Fig. 1, Plate No. 35.—The "FLORID RATA."—This beautiful species is a lofty climber in all stages of its existence, often clothing the tallest trees of the forest. It is common throughout the Islands, and was first noted by Banks and Solander. The plant blossoms nearly throughout the year, and its flowers are exceedingly handsome and large, collected into terminal or axillary cymes, which are profuse and attractive. It is commonly called "Rata" and is often confounded with its ally, *M. robusta,* the Rata proper; it may however, be readily distinguished by its larger leaves and flowers, and above all by the capsule being included within the calyx-tube, whereas, not more than one half of the capsule of *M. robusta* is included in the calyx-tube. The specific name is due to the florid or ornamental display of flowers which adorn these

PLATE No. 35.

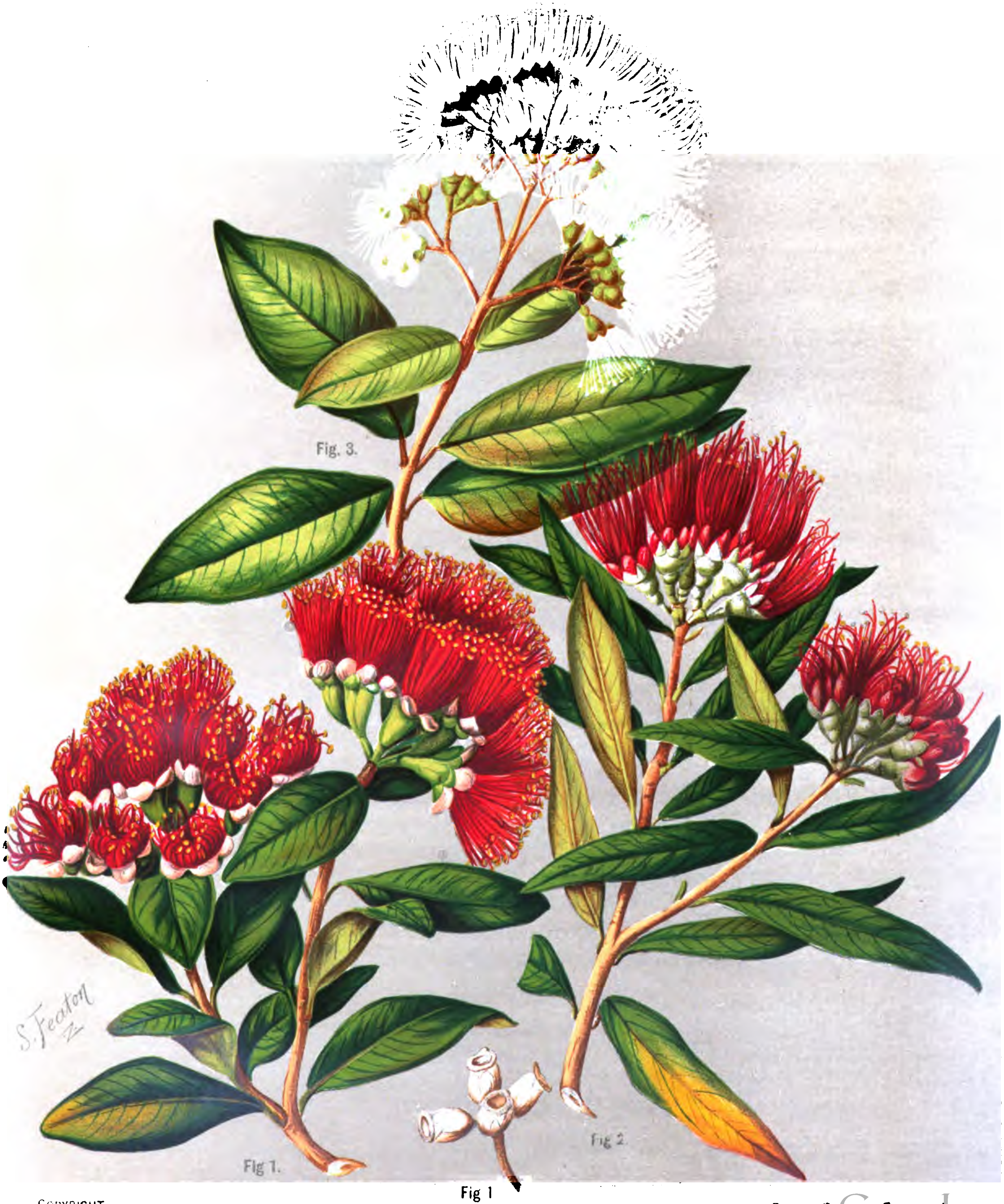


Fig. 3.
S. Featon
Fig 1.
Fig 2.
Fig 1

COPYRIGHT.

BOCK & COUSINS CHROMO-LITHO

1.—METROSIDEROS FLORIDA and SEED CAPSULE. 2.—METROSIDEROS LUCIDA. 3.—METROSIDEROS ALBIFLORA.

beautiful climbers. Our plate bears out in portrayal, the attractive character of the plant, and fully justifies the luxuriance of growth which marks it as coming from the Nelson district.

2. METROSIDEROS LUCIDA. (*Menzies*). The Shining-leaved Metrosideros.

Specific Character.—A small, erect, branching evergreen tree; bark pale, papery; branches obscurely tetragonous; twigs and young leaves silky. Leaves 1–3½ in. long, elliptic-lanceolate, acuminate at both ends, shortly petioled, very coriaceous, shining above, quite glabrous; midrib stout, lateral nerves faint, oblique, under surface with large glands. Flowers three or more together, sessile, or shortly pedicelled at the ends of the branches. Calyx broadly obconic, ¼ in. long; tube silky. Lobes ovate, obtuse, persistent. Petals small, oblong or linear, scarlet. Stamens scarlet, very numerous, and style very stout, nearly 1 in. long; ovary free above the middle. Capsule broadly urceolate, with 5 stout ribs, the upper free, 3-valved, part enclosed in the coriaceous calyx-limb.—*Handbook of the New Zealand Flora, p.* 71.

Description, etc.—Fig. 2, Plate No. 35.—The "SOUTHERN RATA," or "IRONWOOD."—This species is usually found in hilly situations ascending to 3,500 feet, from Cape Colville in the Northern Island, to the Bluff in Southland. It is abundant in the Middle Island, and forms the greater part of the forest in the Lord Auckland group. It descends to the sea level in the Bluff Harbour. Sometimes it attains a height of from thirty to sixty feet with a trunk from two to five feet in diameter, but is often of less size. The timber is reddish and close grained, similar to *M. robusta*, (the Northern Rata) but is less dense in texture, and has the disadvantage of splitting too freely. It has been used for ship-building purposes in the southern districts, but it is inferior in quality and strength to its ally, *M. tomentosa* (Pohutukawa). It has as well been used in the construction of railway plant, for which its durability renders it well adapted. It is likewise valuable for cabinet work and answers well for cogs of spur-wheels. The tree is in flower from November to January, and its conspicuous scarlet flowers render it a charming adjunct to the mountain scenery. Our plate will convey to the mind a picture of what this bright-leaved, gorgeous-flowered Rata must be when blooming in its native mountain home. Like most of the very conspicuous plants of the genus, it owes its brilliancy to the long tassels of crimson stamens in each flower. The flowers are destitute of scent, but secrete honey, which is extracted by the Tui and other birds. Our specimen of this plant was collected at Nelson, where the species is remarkable for its beauty and luxuriance.

3. METROSIDEROS ALBIFLORA. (*Banks and Sol.*) The White-flowered Metrosideros.

Specific Character.—A lofty climber; trunk stout; branches perfectly glabrous, branches terete. Leaves decussate, 1½–3 in. long, elliptic-lanceolate, acuminate at both ends, shining above, very coriaceous, shortly petioled; margins recurved when dry; midrib stout, lateral veins numerous, delicate, leaving the costa at an acute angle. Flowers in terminal, leafless, many-flowered, branched, glabrous cymes. Peduncles and pedicels rather slender. Calyx scarcely ¼ in. long, campanulate; lobes shortly ovate, obtuse, persistent. Petals small, white, orbicular. Stamens and style very slender. Ovary wholly adnate to the base of the calyx-tube. Capsule ⅓ in. long, urceolate, turgid, 3-lobed, bursting loculicidally, crowned by the much narrower tubular calyx, which is terminated by the reflexed persistent lobes.—*Handbook of the New Zealand Flora, p.* 71.

Description, etc.—Fig. 3, Plate No. 35.—The "WHITE-FLOWERING RATA." This handsome climber is indigenous to the dense forests of the Bay of Islands and the East Coast, but is not abundant. It blooms in early summer, and its flowers are much prized for their elegance. The infloresence is generally more slender and delicate than that of the other "Ratas," and growing profusely in terminal leafless cymes, it is very attractive. It ascends the lofty trees of the forest, festooning their huge limbs with its white tasselled flowers, which at all times are difficult to obtain. In common with many others of our New Zealand plants, it however fell a prize to Banks and Solander the great naturalists, by whom it was first classified. Our plate is a good delineation of a specimen collected at the Bay of Islands by Miss M. Clarke, of Waimate, who kindly furnished it for the use of this work. As the plant is not generally known, this beautiful Rata will be an object of interest to the majority of our readers.

OTHER SPECIES OF METROSIDEROS.

4. M. DIFFUSA. (*Smith.*)

A large, climbing glabrous shrub with pale ragged bark, and slender, obscurely 4 gonous branches. Leaves somewhat distichous, $\frac{3}{4}$ to $1\frac{1}{4}$in. shortly petioled, elliptic-oblong, obtuse; midrib, and oblique lateral veins prominent. Flowers in terminal and lateral many-flowered, puberulous, often leafy cymes. Calyx $\frac{1}{3}$in. long, suddenly expanding into a cup-shaped limb, with orbicular deciduous lobes. Petals orbicular, scarlet, with slender scarlet stamens. It is frequent in the forests of the Northern Island, where it encircles the trunks of the larger trees. This species is termed *diffusa*, from the diffuse or spreading character of the plants.

5. M. HYPERICIFOLIA. (*A. Cunn.*)

A larger, rambling, climbing shrub with ragged bark, and slender, divaricating, 4-angled branches. Leaves small, distichous, sessile, ovate-oblong, or oblong-lanceolate, acute or apiculate, glabrous on both surfaces, rather membranous. Midrib, and lateral nerves, delicate. Flowers white, small, with the stamens $\frac{1}{3}$ to $\frac{1}{2}$ an inch long, in short, lateral, few-flowered racemes. Petals orbicular, scarlet, stamens and style slender. Found in humid forests throughout the Islands from the Bay of Islands southward to Chalky Bay. The specific name is due to the Hypericum-leaflike character of the foliage. Flowers in December and January.

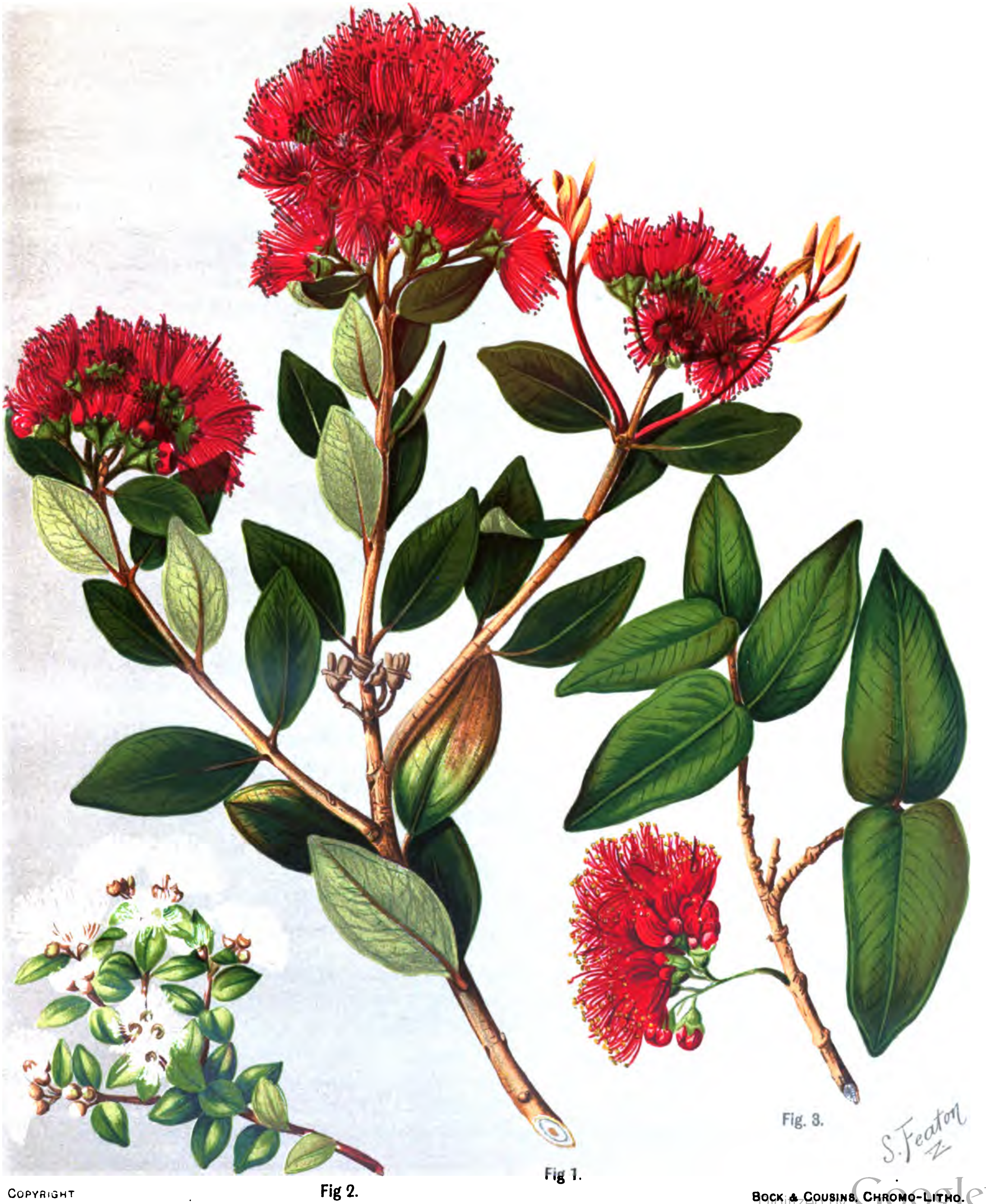


Fig. 3.
S. Featon
Fig 1.
Fig 2.

COPYRIGHT

BOCK & COUSINS. CHROMO-LITHO.

1—Metrosideros robusta. 2—Metrosideros scandens. 3—Metrosideros Parkinsonii

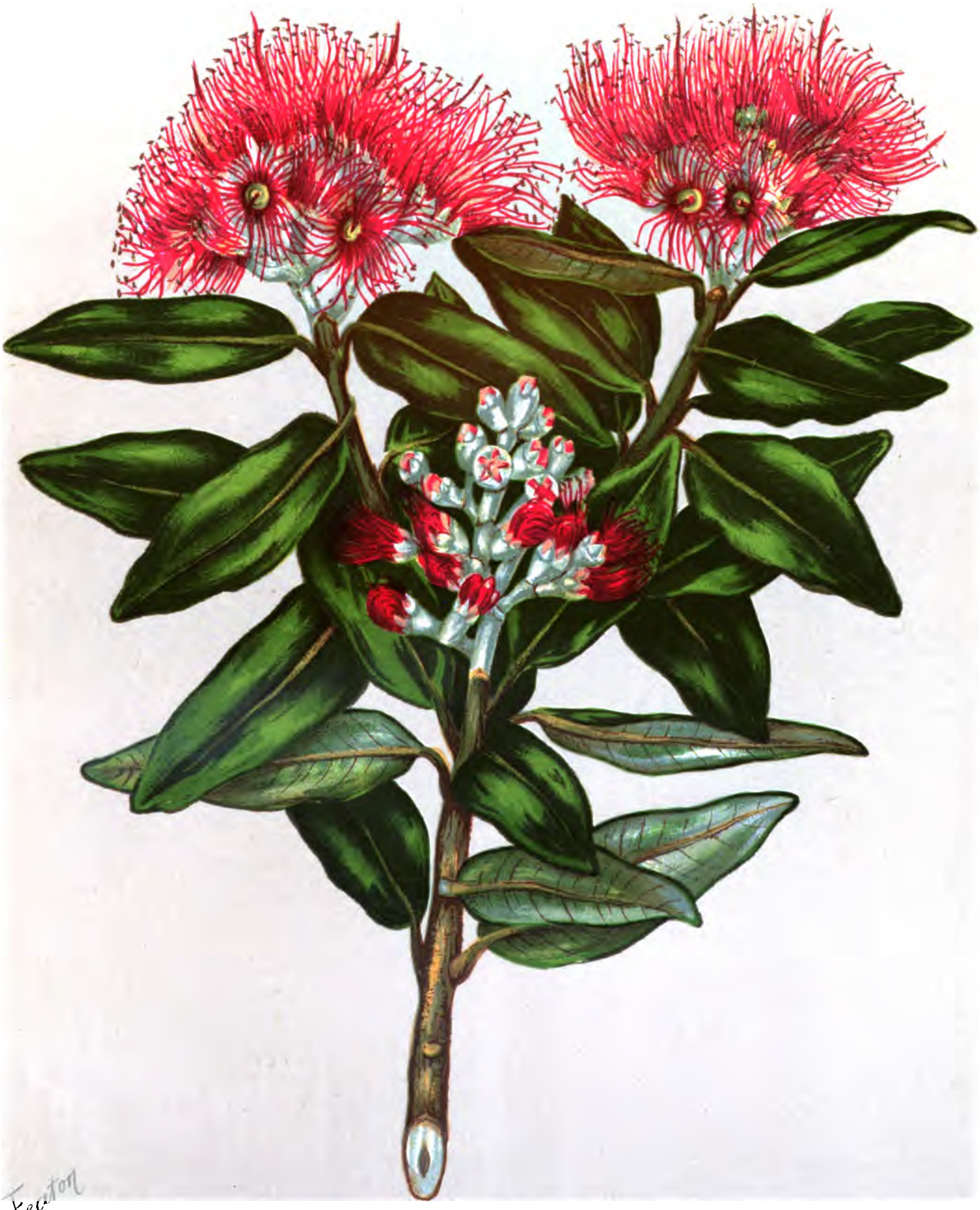
6. M. COLENSOI. (*Hook., F.*)

A slender twiggy climbing shrub with very slight branches, and small leaves, distichous, scarcely petioled, the flowers are white, small, and displayed in axillary, branched many-flowered cymes; the flowers with the stamens scarcely exceed ½ an inch in length. The calyx is narrow, funnelled in shape. Petals orbicular, scarlet. Stamens and style very slender. Found in the forests of the Bay of Islands and East Coast, it is closely allied to *M. hypercifolia,* but at once distinguished by its slender habit, glabrous not divaricating branches, and acuminate leaves. The species was named by Sir. J. D. Hooker after that veteran in New Zealand botany, Mr. Colenso, F.L.S. Flowers in December and January.

7. METROSIDEROS ROBUSTA. (*A. Cunn.*) The Robust Metrosideros.

Specific Description.—A tall, erect, (never climbing) glabrous tree, 50–60 ft. high; bark smooth, pale; branches robust, terete, the ultimate 4-gonous. Leaves decussate, petioled, 1–1½ in. long, elliptic or ovate-oblong, obtuse or retuse at the tip, very coriacious, glabrous on both surfaces, reticulated with numerous very fine close-set veins. Flowers with the stamens 1 in. long, in dense many-flowered terminal, pubescent cymes; peduncles and pedicels short and thick. Calyx-tube short, obconic, scarlet, shortly clawed. Stamens and style rather stout. Ovary adnate below the middle with the calyx-tube. Capsule urceolate, small, ¼–⅓ in., girt round the middle by the calyx-tube, the upper part free, and loculicidally 3-valved.—*Handbook of the New Zealand Flora, p.* 72.

Description etc.—Fig. 1, Plate No. 36.—The "RATA."—This beautiful, useful, and interesting tree is almost confined to the Northern Island, and is specially abundant in some parts of the Kaipara district, where it attains its maximum of development. It often grows as an erect tree to a height of from fifty to sixty feet, with a trunk four feet in diameter, but the descending roots often form a hollow stem twelve feet in diameter. It is common in forests from sea level, up to 2,000 feet on the mountains. The timber is of a dark red colour, long in grain, dense in texture and durable, similar to Ironwood (*M. lucida*) while it can be obtained of much larger dimensions, and therefore affords greater facilities for construction purposes. It is used for ship-building, but for this purpose is inferior to Pohutukawa (*M. tomentosa.*) As tramway sleepers it has been employed with success, and found perfectly sound after being in use for many years. It is likewise employed as spurs for cog-wheels, and has proved its utility in the construction of wheels, and for cabinet and inlaying purposes. The habit of growth of this species, being both peculiar and interesting, requires some explanation at our hands to dispel the popular belief with which it is surrounded. It is generally affirmed that the plant is a climber, and that it commences life as a slender thread-like parasite, creeping in numerous rope-like stems up the trunks of the forest trees, gradually enclosing them until they perish, and then uniting to form a noble tree with an enormous hollow trunk taller than that which it has destroyed. This error has arisen probably from the general resemblance which the foliage and inflorescence of this species bears to one of the scandent varieties (*M. florida*), which is also called "Rata," and is a climber in all stages of its existence, but may readily be distinguished by its larger leaves and flowers, its weak stems, and above all by the capsule being included within the calyx-tube. More than half the capsule of *M. robusta* is not included in the calyx-tube. The brief facts of the case are simply these:—*M. robusta* in habit is naturally erect, as demonstrated by the young plants in cultivation, and in others found plentifully in many localities. There is no tendency to a climbing habit under these conditions, though it produces a few much-branched stems, and does not give any decided indications of a true arboreal stem until it is of a large size. But some of the plants have an epiphytic origin, which will presently be explained. It is true that our plant is often found destroying large trees by which it is supported, and these instances are employed as a decisive proof of its climbing habit. The true case is, however, that *M. robusta* is exactly the reverse of a climber, the so-called trunks or stems being aerial roots sent down by an epiphytic plant in search of nourishment. The seeds of the tree are conveyed by birds, or blown by the wind amongst the epiphytic masses of vegetation growing in the forks of the forest trees. The seed in due time germinates, and forms a small bush, obtaining for a time sufficient nourishment from the decaying vegetation in which it is growing, until, the supply proving insufficient for the sturdy young interloper, its roots stretch down the trunk of the supporting tree in search of that sustenance which can only be obtained from the ground. Sometimes a single root is given off, at others several roots of equal dimensions are to be found thus employed, but in nearly all cases the several roots or stems are bound together by smaller roots which are given off at right angles to the supporting tree, and become united with the main roots by inosculation. In course of time the various stems become firmly combined and the foster tree is literally strangled in their iron embrace. Thus our "Rata" which commenced its career as a humble dependant, becomes a majestic denizen of the forest, standing alone in vigour long after its benefactor has gone to decay. A full and lucid account of "The Habit of the Rata," by Professor Kirk, F.L.S., was published in Vol. IV. of the "*Transactions and Proceedings of the New Zealand Institute*, 1871," which clearly and scientifically sets at rest any disputes on this question, and to which we would refer our readers for further information. The "Rata" blossoms in January, when the forests in the Northern districts are all a-blaze with its showy crimson flowers profusely displayed; the hill sides in some localities appearing as it were "all on fire." As firewood it is much prized. The tree is sometimes though improperly designated the "Female Pohutukawa."



S. Fearon

COPYRIGHT

Bock & Cousins, Chromo Lith.

POHUTUKAWA—Metrosideros Tomentosa

8. METROSIDEROS TOMENTOSA. (*A. Cunn.*). The Tomentose-leaved Metrosideros.

Specific Character.—A short, stout, much-branched tree, 30–40 feet high; branches very stout, terete, densely tomentose. Leaves decussate, petioled, 1–3 in. long, variable in shape from linear-lanceolate to oblong, or orbicular oblong, rounded or narrowed at the tip, very coriaceous, margins recurved, glabrous, finely reticulated above, densely or laxly clothed with snow-white tomentum below, rarely glabrous. Flowers large, with the stamens 1½ inches long, in terminal, many-flowered, lax or dense cymes, densely clothed with white tomentum; peduncles and pedicels very stout. Calyx-tube obconic; lobes short, triangular-ovate. Petals orbicular, scarlet, clawed, tomentose on the back. Stamens and style very long and stout. Ovary adnate below the middle with the base of the calyx-tube. Capsule ½ inch long, woody, girt round the middle by the calyx-tube, bursting loculicidally.—*Handbook of the New Zealand Flora, p. 72.*

Description, etc.—Plate No. 37.—The "POHUTUKAWA."—This handsome flowering and useful tree, is confined to the Northern Island, from the North Cape to Tokomaru on the East Coast, and to Taranaki on the West Coast. It is most abundant in the vicinity of Auckland, growing on the sea-shore around the bays and harbours, where it is easily recognised by its huge gnarled branches and silvery foliage. It is likewise found fringing the shores of some of the inland fresh water lakes, more particularly Lakes Tarawera and Waikaremoana. The former lake was noted for its growth of beautiful specimens, which were wholly destroyed during the eruption of Mount Tarawera, on the 10th June, 1886. The tree is reported as indigenous on the sea-coast near Collingwood, in the Nelson District, but the fact is not fully authenticated by botanists. Solitary specimens have, however, been met with in Poverty Bay, and on the Mahia Peninsula, but they are generally believed to have been planted by the Natives. The tree when fully developed sometimes attains a height of sixty feet or more, but with a comparatively short trunk, two to four feet in diameter, and numerous massive tortuous arms. The peculiar habit of growth, combined with its great durability, renders it specially adapted for the purpose of the ship-builder, and its wood has formed the framework of numerous splendid vessels built in the Northern ports. For this purpose it is superior to the Rata, *M. robusta,* and to the Ironwood, *M. lucida,* both of which are in use for naval purposes. The wood is reddish in colour, very dense, and long in grain. It has been used with success for naves and felloes of wheels, and for chocks in bridges, and is accounted impervious, or nearly so, to the attacks of the *Teredo,* or marine worm. As firewood it is highly approved, and as a heat-producer stands next in order to the Puriri, and the Kowhai. The juice of the inner bark is said to possess a medicinal virtue, and the Maoris are accustomed to use it to allay inflammation, and promote healing in gunshot and gangrenous wounds. The Pohutukawa blossoms in December, when its profusion of elegant crimson-tasselled flowers imparts a beauty to the rugged coast line and sheltered bays which may fairly be called enchanting. To the settlers it is known as the "Christmas Tree," and sprays of its foliage and flowers are used to decorate the interiors of churches, and dwellings during the festive Christmas-tide. The time-honoured plum-pudding is likewise garnished with its floral offerings, and it serves to keep fresh in the minds of many the once loved Holly of the old land. To the Maoris the tree must possess a weird significance, since it is related in their traditions that at the extreme end of the North of New Zealand there grows a "Pohutukawa," from which a root descends to the beach below. The spirits of the dead are supposed to descend by this to an opening, which is said to be the entrance to "Te Reinga."

> Grim, gaunt, and weird,
> Adorned with strange fantastic arms
> It stands : a silent beacon
> To departing shades ;
> A leafy portal to the gates
> Of dark and mystic worlds.

The Maoris formerly used the flowers of this species, as well as those of the Rata, *M. robusta,* as bait to catch the Tui (Parson Bird), and the Korimako (Bell Bird) of the settlers. The birds came to sip the flowers, called thither by a peculiar cry from the fowler, and a sudden jerk of a running noose secured them firmly by the leg, when they fell an easy prey to their credulity. Though the Pohutukawa is indigenous to the Northern Island, north of the parallel of Poverty Bay, it is gratifying to know that the species will thrive even as far south as Wellington, where it has been taken into cultivation. Apart from the utility of the wood, it forms a tree of great picturesqueness and beauty, and is without doubt worthy of every attention that may be bestowed upon it. Young trees may be obtained from Auckland nurserymen, who have been eminently successful in raising seedlings. We must not omit to mention that this tree, or a very close variety, has been noted by Mr. T. Cheeseman, F.L.S., as existing on the Kermadec Islands, where it is plentiful, and may hereafter be of great service for ship-building purposes.

OTHER SPECIES OF METROSIDEROS.

9. M. POLYMORPHA (*Forst.*)

This species is a small branching tree excessively variable in foliage, and in being woolly, downy or glabrous. It is found abundantly throughout all the Pacific Islands, the Kermadec Islands, and New Caledonia, but is absent in Australia. The variety from Kermadec Island has downy branches, and coriaceous, petioled decussate leaves, $\frac{3}{4}$ to $1\frac{1}{4}$ inches long, obovate, rounded at the tip; veins, finely reticulated; margins, recurved. The flowers are in terminal, many-flowered cymes; peduncles and calyx, white, woolly. Calyx $\frac{1}{4}$ in. long, hemispherical, lobes triangular, persistent, often tipped at the back with a black gland. Petals white or scarlet. Stamens $\frac{1}{2}$ to $\frac{3}{8}$ in. long. Ovary, woolly at the top. Capsule 3-lobed, 3-valved, sessile in the broad calyx-tube, which is attached to its middle. It is one of the most variable trees in the world, hence its specific name.

10. METROSIDEROS SCANDENS (*Banks & Sol.*) The Scandent Metrosideros.

Specific Character.—A large climbing shrub, or small tree, with spreading, terete, tomentose branches. Leaves distichous, ⅓–½ in.; sessile, broadly ovate-oblong, or orbicular, obtuse, glabrous, the younger pubescent, very coriaceous, below covered with large glandular dots, 3-nerved; margins recurved. Flowers, with the stamens, ½ in. long, in short few-flowered, sub-globose, terminal, rarely lateral, pubescent cymes; peduncles, and pedicels rather slender. Calyx-tube very broadly obconic; lobes short, obtuse, deciduous. Petals orbicular, whitish. Stamens and style rather slender. Ovary adnate below its middle, with the base of the calyx-tube. Capsule small, globose, ⅙ in. diam. girt at the middle by the calyx-tube the free portion loculicidally 3-valved.—*Handbook of the New Zealand Flora, p.* 73.

Description, etc.—Fig. 2, Plate No. 36.—The "AKA" or "AKAKURA."—This beautiful climber is common in forests throughout both Islands, and at the Lord Auckland Group. It is noticeable by its small box-tree like leaves, and myrtle-like white flowers, ascending the trunks of the forest trees in a vigorous manner. It attaches itself to the bark by throwing out thread-like rootlets from the main stems which cling tenaciously to the giant friend, that is destined to sustain it in its upward growth. In this manner it mounts high into the branches and clothes them with its foliage. The plant blossoms in January, and is charmingly pretty, its white blossoms contrasting well with the plentiful bright green foliage, which covers its vine-like stems. The wood is hard and heavy, but does not attain any size of sufficient importance to be useful for constructive purposes. This species was first classified by Banks and Solander and named *M. scandens,* but successive botanists thought fit to change its nomenclature to *M. perforata, M. buxifolia, Melaleuca perforata* and *Leptospermum perforatum.* The Editor of the "*Handbook*" has deemed it advisable to finally rename it *M. scandens,* which without doubt is the most desirable, if only in compliment to the great naturalists who first established its genus.

11. METROSIDEROS PARKINSONII (*Buchanan*). Mr. Parkinson's Metrosideros.

Specific Character.—A large robust climbing shrub with the terminal twigs 4-angled. Whole plant glabrous. Leaves distichous, shortly petioled, 1½–2 in. long, oblong lanceolate, acute, midrib prominent, lateral nerves indistinct. Flowers numerous in robust little cymes which grow from the branches, but are never axillary to the leaves; peduncles and pedicels rigid, stout; flowers, including stamens, 1 in. long. Calyx pyriform widening at the mouth, and produced beyond the ovary, lobes triangular, petals large, bright crimson, oblong, acute, lacerate on the margins. Stamens and style stout. Ovary adherent only at the base to the calyx-tube. Capsule 3-valved, upper part free.—*Transactions and Proceedings of the New Zealand Institute, Vol.* XV., *p.* 339

Description, etc.—Fig. 3, Plate No. 36.—This elegant species is known only at Collingwood in the Nelson district, where it was collected by Mr. H. H. Travers in the year 1882. It differs from *M. hypercifolia* (to which it is allied) in its larger size, upright habit of branching, smooth bark, and position of capsule in the calyx. From *M. Colensoi* (to which it is also allied) it differs in the cymes never being axillary to the leaves, and in the free position of the capsule in the calyx-tube. We are indebted to Mr. James Dall, botanical collector of Collingwood, for the specimen from which our drawing was made, being one of many floral contributions forwarded by that gentleman for delineation in our pages. The species was named by Mr. Buchanan, the classifier, in honour of Mr. Sydney Parkinson, the botanical draughtsman who accompanied Banks and Solander on Captain Cook's first voyage to New Zealand. It blossoms in December, and displays a profusion of delicately tasselled crimson flowers of great beauty.

GENUS II.

MYRTUS. *(Linn.)* The Native Myrtles.

Generic Character.—Trees or shrubs. Leaves, evergreen, opposite, often coriaceous, pellucid-dotted, Flowers axillary, solitary, or in few-flowered cymes. Calyx-tube globose; Limb 4 or 5-lobed, imbricate. Petals 4 or 5. Stamens very numerous, longer than the petals. Berry globose crowned with the persistent calyx-lobes; 2 or 3-celled; cells, many or few seeded. Seeds reniform or angular; testa long; embryo terete, curved; cotyledons small.—*Handbook of the New Zealand Flora, p.* 73.

Description, etc.—A genus scattered over the temperate and warmer countries of the globe, of which the Common Myrtle (*M. communis*) is the only European example, but of which many species inhabit the South Temperate Zone, one extending to Cape Horn, and two to Otago in the Middle Island of New Zealand. The genus is absent in Tasmania. The plants vary much in stature. *Myrtus nummularia*, a native of the Falkland Islands, spreads over the ground like the European thyme, while the Common Myrtle generally forms a large bush, and others are small trees. *M. communis*, the Common Myrtle, is well known by its shining evergreen leaves, and white sweet-scented flowers. Though extremely abundant in the south of Europe, it is not indigenous, having originally been brought from Western Asia. The wood is of great hardness, and beautifully veined, but from its small size it is only fit for turnery. New Zealand is represented by four beautiful and varied species, viz.:—(1.) *M. bullata*, an erect shrub or small tree; (2.) *M. Ralphii*, very similar to the former; (3.) *M. obcordata*, a small, erect or decumbent shrub; (4.) *M. pedunculata*, a straggling shrub.

1. MYRTUS BULLATA. *(Banks & Sol.)* The Inflated-leaved Myrtle.

Specific Character.—An erect shrub or small tree, 10–15 ft. high; branches terete, tomentose, as are the young leaves, peduncles and calyx. Leaves shortly petioled, 1–2 in. long, broadly elliptic-ovate, or orbicular ovate, obtuse, acute, or apiculate, coriaceous, often red-brown when living, the surface turned between the veins. Peduncles axillary ½–1½ in., 1-flowered. Calyx-tube turbinate, 2-bracteolate at the base; lobes 4, broadly ovate, obtuse. Petals 4, orbicular, pale pink. Stamens numerous, white; filaments and style slender. Berry urceolate, ½ in., long, turgid, black, 2-celled with several flat reniform seeds in each cell; testa very thick and long; embryo very slender curved.—*Handbook of the New Zealand Flora, p.* 74.

Description, etc.—Fig. 1, Plate No. 38.—The "RAMA-RAMA." This singular leaved species is almost confined to the Northern Island, where it is frequent in forests, and varies from a small upright shrub, to a tree twelve to fifteen feet in height, with a

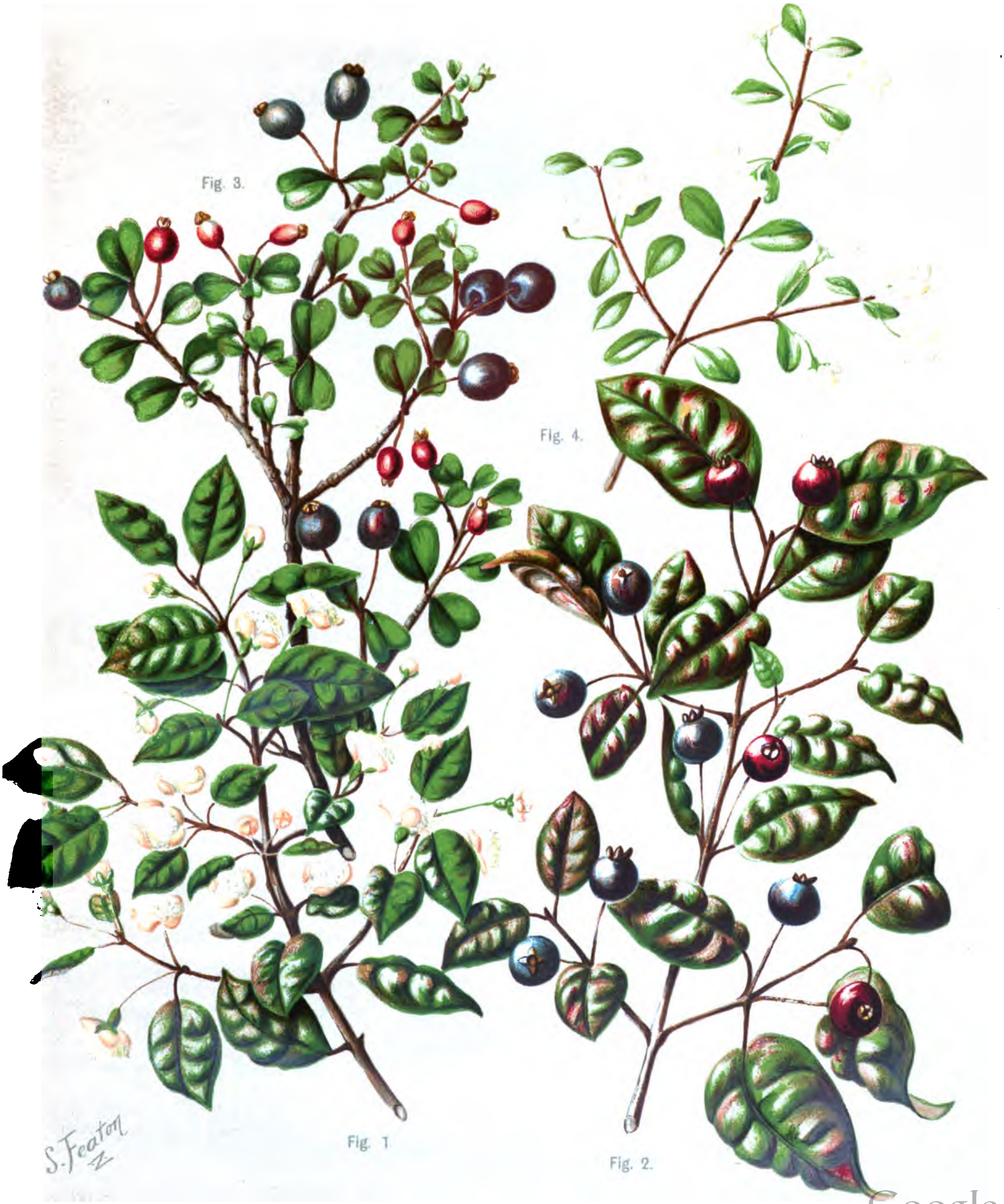


Fig. 3.
Fig. 4.
Fig. 1
Fig. 2.
S. Featon

COPYRIGHT.

BOCK & COUSINS, CHROMO LITH.

1. MYRTUS BULLATA, Flower. 2. MYRTUS BULLATA, Fruit. 3. MYRTUS OBCORDATA.

trunk ten inches in thickness, the wood of which is valued for purposes requiring density and toughness. It is also of importance in cabinet work. The Rama-rama blossoms from December to February, when its inflated foliage (bronzed where exposed to the sun) and white myrtle-like flowers render it an attractive plant. In some districts it is very plentiful, whilst in others of equal parallel it is unseen. As a shrub it has an upright growth, and is altogether of a nice appearance. It has been taken into cultivation, but is worthy of much more attention in that direction. It will thrive in any light soil, and may easily be raised from seed. Our plate portrays the plant both in flower and in fruit, and is faithfully rendered.

2. MYRTUS RALPHII. *(Hook., F.)* Mr. Ralph's Myrtle.

SPECIFIC CHARACTER.—Very similar in habit, form of the foliage and flowers to *M. bullata*, but the leaves are smaller and quite plane, the branchlets more slender, scarcely tomentose.—*Handbook of the New Zealand Flora, p.* 74.

DESCRIPTION, etc.—This species is peculiar to the Northern Island, in forests near Wellington, and on the East Coast. It is much more slender in all its parts than the Rama-rama (*M. bullata*), and is considered by the Editor of the "Handbook" to be a variety of that species, though he states that he had not seen a fruiting specimen. The leaves are on a plane, and not undulating, or having the inflated appearance which is peculiar to the Rama-rama. The plant blossoms from December up to February. It is named in honor of Mr. Ralph, its discoverer.

3. MYRTUS OBCORDATA. *(Hook., F.)* The Obcordate-leaved Myrtle.

SPECIFIC CHARACTER.—A small, much-branched, erect or decumbent shrub, with slender pubescent branches. Leaves small ¼-½ in. long, obcordate, narrowed into a short petiole, coriaceous, glabrous on both surfaces. Peduncles solitary, slender, about as long as the leaves, 1-flowered, pubescent. Flowers small, about ¼ in. long. Fruit oblong, ¼ in. long, black or violet, with 1 or 2 bony, reniform seeds.—*Handbook of the New Zealand Flora, p.* 74.

DESCRIPTION, etc.—Fig. 2, Plate No. 38.—The "ROHUTU." This myrtle is common to both Islands. In the Northern it is indigenous to the East Coast and interior, and in the Middle Island it ranges from Nelson down to Otago. It is generally a small compact bush of slow growth and slender habit, with pretty heart-shaped foliage, though in some parts of the south it is referred to as a small tree, with a trunk from six to ten inches in diameter. The leaves are small, pale green, and variegated along the margin and on the course of the veins. The peculiar heart-shaped foliage gives a name to this species. The Rohutu flowers in December, and is in ripe fruit in April. We have chosen this latter stage to figure in our plate, as the plant is then seen to best advantage.

4. MYRTUS PEDUNCULATA. *(Hook., F.)* The Pedunculate Myrtle.

SPECIFIC CHARACTER.—A straggling shrub 10–12 ft. high, glabrous, much resembling *M. obcordata*, but the branches are 4-gonous, and perfectly glabrous, the leaves obovate, or oblong-obovate, and rounded at the tip, rarely acute, peduncles and calyx perfectly glabrous. Berry small, very few seeded, orange-yellow.—*Handbook of the New Zealand Flora, p.* 74.

DESCRIPTION, etc.—Fig. 3, Plate No. 38.—This species is indigenous to both Islands. In the Northern one it is peculiar to the hilly districts of the East Coast and interior, and in the Middle Island is reported from both Nelson, Akaroa in the Canterbury District, and Otago. It is a straggling shrub resembling the Rohutu, and is sometimes known by that name, but it is less compact in habit than that species, and its fruit consists of small, though pretty orange-coloured berries. These were formerly eaten by the Maoris, and were obtained by spreading their garments or mats on the ground and shaking the trees, when the fruit fell in showers upon them. It blossoms in December, and grows best in a shady situation. It is difficult to say how it derived its specific name, as its peduncles are not different from those of the allied species, other than that they are perfectly glabrous, and those of *M. obcordata* are pubescent. Our plate figures the plant in bloom.

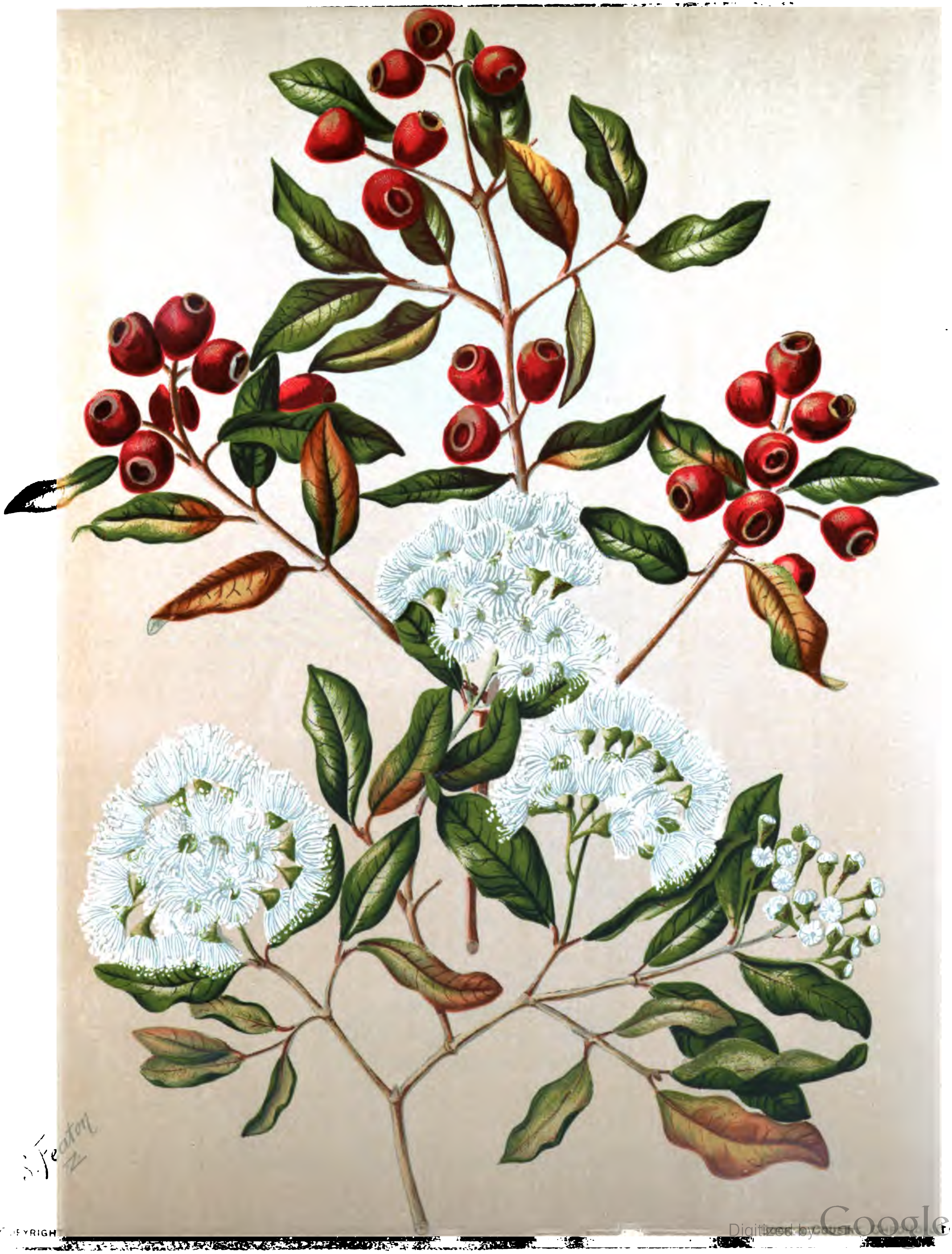
GENUS IV.

EUGENIA. (*Linn.*) The Eugenia.

GENERIC CHARACTER.—Characters almost identical with those of *Myrtus*, except that the seeds are few, large, with a thick embryo, often presenting no trace of cotyledons. The New Zealand species of *Myrtus* further differ from *Eugenia maire*, in wanting the corymbose inflorescence.—*Handbook of the New Zealand Flora, p.* 74.

DESCRIPTION, etc.—A tropical genus of trees and shrubs, abounding in Asia and America, extending into New Zealand and Chili, but absent in Tasmania. The most important species is *Eugenia pimenta*, which furnishes the allspice of commerce. This consists of the fruits gathered before they are quite ripe, and dried in the sun. The allspice tree is cultivated in the West Indies, where the trees are planted in rows called pimento walks. The berries are of the size of a small pea of a dark colour, and surmounted by the remains of the calyx. The odour and flavour are supposed to resemble a combination of those of cinnamon, cloves, and nutmeg, hence the name allspice; they are due to a volatile oil, which is obtained by distillation. Allspice is largely used for flavouring purposes, and the oil is occasionally employed as a carminative. Many of the species yield edible fruits such as *E. cauliflora*, a native of Brazil, described as being of the size of a greengage, very agreeable and refreshing. The Rose-apples of the East are the produce of *E. malaccensis* and *E. jambos*. The species *E. ugni*, a native of Chili, has been introduced into English gardens, where it is at least as hardy as its near ally the Myrtle. Its fruit is highly esteemed in Chili, and

PLATE No. 39.



PYRIGH

MAIRE TAWHAKE—Eugenia Maire.

has an agreeable flavour and perfume. Numerous other species are grown either for their handsome foliage or for their flowers; *E. luma* is one of the most beautiful of these. The genus is represented in New Zealand by one species—*Eugenia maire,* a beautiful small tree, with the habit of a *Metrosideros.*

1. EUGENIA MAIRE. (*A. Cunn.*) The Eugenia Maire.

Specific Character.—A small tree, with the habit of a *Metrosideros,* 30–50 ft. high, everywhere glabrous; bark white; branches slender, 4-angled. Leaves petioled, 1–2 in. long, oblong-lanceolote, acuminate, membranous, with delicate veins. Flowers almost unisexual, in terminal, branched, many-flowered corymbs 2–3 in. diam., white; peduncles and pedicels very slender, the latter often in threes. Calyx-tube broadly obconic; lobes very short, broad, deciduous. Petals orbicular, often falling before expanding. Stamens and style very slender, ⅔ in. long, ovary wholly adnate with the base of the calyx-tube, 2-celled, with many ovules on the septum of the cell. Berry ⅓ in. long, urceolate, or broadly pyriform, crowned with the narrower cup-shaped calyx-limb, 1-celled, 1-seeded. Seed large, amygdaloid.—*Handbook of the New Zealand Flora, p.* 75.

Description, etc.—Plate No. 39.—The "MAIRE-TAWHAKE." This beautiful small tree is almost wholly confined to the Northern Island, on swampy land, and principally in the northern districts. A soft-wooded specimen has been brought to our notice by Mr. J. Dall, Botanical Collector of Collingwood, as growing a short distance inland of Wakapuaka, in the Nelson district. The fruiting specimen given in our plate is from this locality, and is remarkable for the large size of its berries and general luxuriance. The character of the wood in being soft in the Nelson specimen is opposed to the general nature of the timber in the typical form which is compact, heavy, and durable. This has been used for jetty piles, and mooring posts on the Waikato River with success, remaining sound after being in use for many years. It is highly valued for fencing, and might prove useful as railway sleepers in districts where it is plentiful. We regret, however, to state that the tree is fast becoming scarce, and in many localities where a few years ago it was plentiful it is now not to be found, having been cut out, or died off as the swampy lands became drained. The Maire-Tawhake blossoms in April, when its beautiful white flowers are plentifully displayed in handsome corymbs. When in fruit the tree is very gay with its bright red berries temptingly hanging from the tips of its slender branches. In former days the Maoris used the hard wood of this tree to construct the spades with which they broke up the soil to receive the seeds and plants that furnished them with sustenance.

END OF VOL. I.

GLOSSARY,

OR

EXPLANATION OF SOME OF THE TERMS USED IN BOTANICAL WORKS.

COMPILED FROM LOUDON'S "ARBORETUM ET FRUTICETUM BRITANNICUM."

A.

Accessory, something added to the usual number of organs.
Accumbent, reclining or lying on.
Acerose, slender or needle-shaped, as in the leaves of some of the cone-bearing trees.
Achenium or Achene, a dry fruit, which does not open when ripe, and contains one seed not adhering to the pericarp.
Acicular, needle-shaped.
Acuminate, having a taper point.
Acute, sharp pointed.
Adnate, grown to for its full length.
Æstivation, the folding of the parts of a flower in the bud.
Aggregate, clustered.
Albumen, the solid farinaceous part of the seed destined to nourish the embryo.
Albuminous, furnished with albumen.
Alburnum, the sapwood of trees.
Alveolate, honeycomb like.
Ament, a catkin, or inflorescence, consisting of chaffy scales.
Anastomosing, uniting of nerves and veins.
Androgynous, producing flowers of both sexes on the same plant.
Angulate, having acute angles.
Annulated, ringed, exhibiting circular prominences.
Antheriferous, furnished with anthers.
Anther, the part of the stamen which contains the pollen.
Apex, the end, or termination.
Apiculated, terminating in a little point or prickle.
Appendicled, having an additional small leaf at the base of the petiole.
Approximate, near to.
Arborescent, having a tendency to become a tree.
Argutely, sharply.
Aril or Arillus, an enlargement of the placenta adhering to the hilum of seeds, and sometimes enveloping them.
Arrow-shaped, lobed so as to resemble a barbed arrow.
Articulate, jointed.
Attenuate or Attenuated, gradually tapering to a point.
Auricle, an ear-like appendage.
Awl-shaped, narrow pointed.
Awn, a long bristly appendage, as the beard of corn.
Axillary, situated in the axils, or angles formed by the union of the leaf and stem.

B.

Baccate, berry-like, that is, with the seeds buried in a fleshy substance, enclosed in a thin outer skin.
Beaked, ending in a hard curved point.
Biaristate, doubly awned.
Bibracteate, furnished with two bracts.
Bicallose, having two small callosities, or protuberances.
Bicuspidate, having two points.
Bifid, two-cleft.
Bilabiate, having two lips.
Bilamellate, divided into two flat parts.
Bilocular, two-celled.
Binate, a leaf composed of two leaflets at the extremity of a petiole.
Bipartite, two-parted.
Bipinnate, twice pinnate.
Bisetose, having two bristles.
Biternate, twice ternate.
Bladdery, swelled out, hollow.
Bossed, convex, and having a projecting point in the centre.
Bractea or Bract, the floral leaf, situated immediately under the flower.
Bracteate, furnished with bracteas, or bracts.
Bracteole, a small bract.
Bran-like, having a scaly, scurfy appearance.
Bristle-pointed, terminating in a bristle.

C.

Calyx, the outer envelope of a flower.
Campanulate, bell-shaped.

GLOSSARY.—*Continued.*

Canaliculate, channeled, furrowed.

Canescent, somewhat white, hoary.

Capillary, hair-like, very slender.

Capitate, growing in a head, round and blunt.

Capitulate, knobbed, growing in small heads.

Capsule, a dry fruit containing several seeds.

Carina, shaped like the keel of a boat, the lower petals of a pea-flower.

Cariopside, a one-celled, one-seeded, superior indehiscent pericarp, adhering to the proper integuments of the seed which it contains.

Carpel, an individual part of a compound fruit.

Cartilaginous, gristly, a cartilaginous leaf has the edge strengthened by a tough rim.

Catkin, see ***Ament***.

Channeled, having a channel.

Ciliate, surrounded with hairs, as the eyelid is with eyelashes.

Cinereous, grey, or ash-coloured.

Cirrhose, terminating in a tendril.

Clavate, club-shaped, the thick end uppermost.

Claw, the inserted or thick end of a petal.

Cloven, divided into two parts.

Club-shaped, having the thick end uppermost.

Cohering, connected.

Collateral, parallel, side by side.

Compound, used in Botany to express the union of several things in one.

Concave, more or less hollow.

Concrete, of one mass, joined together.

Conduplicate, twice folded.

Conglomerate, heaped, or irregularly crowded,

Conical, cone-shaped.

Conjugate, joined in pairs.

Connivent, lying close together.

Contorted, twisted.

Convex, the reverse of concave.

Convolute, rolled together.

Cordate, heart-shaped.

Cordate-ovate, heart-shaped, rounded at the apex into an egg-shaped form.

Coriaceous, leathery, thick and tough.

Cornute, horn-shaped, of a horny nature.

Corolla, the inner envelope of a flower.

Corymb, a kind of umbel, with the stalks of the outer flowers longer than those of the centre, so as to form a level head.

Corymbose, having the form of a corymb.

Cotyledons, leaves enclosed in the seed, which serve to elaborate the sap before the expansion of the true leaves.

Crenate, scolloped, having round notches.

Crest, a tufted or fringed appendage.

Crisped, curled.

Cruciform, cross-shaped.

Cuneate, wedge-shaped.

Cuneate-lanceolate, a form between wedge-shaped and lanceolate.

Cuneate-linear, a wedge-shaped leaf, which is long and narrow.

Cuneate-oblong, wedge-shaped and oblong.

Cuneate-obovate, a form between wedge-shaped and obovate.

Cup-shaped, having a cup-like appearance, as the cup of an acorn.

Cupular, shaped like a cup.

Cuspidate, spear pointed.

Cuticle, the skin or epidermis.

Cylindrical, round.

Cyme, a kind of umbel, with the stalks of the outer flowers shorter than those of the centre.

Cymose, flowering in cymes.

D.

Decandrous, having ten stamens.

Deciduous, falling off, a tree is said to be deciduous when it does not retain its leaves through the winter.

Declinate, bending downwards.

Decompound, a leaf is decompound when it is twice or thrice pinnate.

Decumbent, lying down on the ground.

Decurrent, running down, a leaf extended down the stem is decurrent.

Decussate, leaves are decussate when they grow in pairs, and alternately cross each other.

Deflexed, bent downwards.

Dehiscent, opening naturally.

Dentate, marginal teeth-like incisions.

Dental-serrate, having the margin divided into incisions, resembling the teeth of a saw.

Denticulate, having the margins finely and slightly toothed.

Dichotomous, branching in pairs ; forked.

Didymous, twins.

Didynamous, having two long stamens and two short ones in the same flower.

Diffuse, widely spread, scattered.

Digitate, fingered, shaped like the hand spread open.

Dilated, widened.

Diœcious, when the male flowers are produced on one plant, and the female ones on another.

Discoid, furnished with a disk, or something that may be compared to a disk.

Disk, the fleshy annular process that surrounds the ovary in many flowers; a receptacle adhering to the calyx; also the surface of a leaf.

Dissepiments, the partitions by which a seed-vessel is internally divided into cells.

Distichous, two-ranked, or two-rowed, produced in opposite rows.

Divaricate, spreading widely in different directions.

Diverging, going far from one point.

Drupaceous, like a drupe.

Drupe, a fruit consisting of a fleshy substance enclosing a hard stone, as a cherry.

E.

Elliptic, oval; twice as long as broad, and about of equal roundness at both ends.

Elliptic-lanceolate, a form between elliptic and lanceolate.

Elliptic-oblong, oblong-ovate.

Elongate, lengthened out.

GLOSSARY.—*Continued.*

Emarginate, having a small notch in the centre of the end or tip.
Embryo, the young plant in the seed.
Endocarp, the inner membrane of fruit which forms the cells.
Ensiform, sword-shaped.
Entire, without marginal incisions.
Epicarp, the external integument of the fruit.
Epigynous, situated upon the style or ovary.
Epipetalous, growing upon the petals.
Eroded, gnawed, irregularly toothed.
Evergreen, retaining foliage through the winter.
Exserted, projecting considerably beyond some other part.
Exstipulate, without stipules.

F.

Falcate, bent like a sickle.
Fascicle, a bundle.
Fasciculate, dispersed in bundles.
Fastigiate, tapering to a point, of compact upright growth, as the Lombardy Poplar.
Ferruginous, rusty, iron-coloured.
Fibrous, composed of fibres.
Filament, the thread-like part of the stamen which supports the anther.
Filiform, thread shaped.
Filmy, having a thin skin.
Flaccid, flabby, not firm.
Flexuous, zigzag, having an undulate direction.
Floccose, woolly.
Floriferous, bearing flowers.
Foliolate, having leaflets.
Follicle, a dry seed-vessel, having only one valve and one cell.
Follicular, having the form of a follicle.
Foramen, a small hole.
Frondose, applied to a stem which is beset with leaves, or to a proliferous flower.
Fruticose, shrubby.
Funiculi, small stalks by which the seeds are attached to the placentas.
Funicle, the singular of *Funiculi*.
Fusiform, spindle-shaped, a carrot is a fusiform root.

G.

Gamosepalous, where the sepals appear to be united in one.
Germern, a name for the orary.
Gibbous, swelled out with excess of pulp; protuberant.
Glabrous, smooth, without hairs.
Gland, a secretory vessel.
Glaucous, sea green, or bluish green.
Glumaceous, having husks.
Granulated, covered as if with grains.

H.

Hastate, formed like the head of a halbert.
Hemispherical, half round.
Hermaphrodite, a flower is so called when it consists of both male and female organs.
Heterogamous, flowers of different sexes in the same head.
Hilum, the external mark or scar of a seed whereby it is fixed to the placenta.
Hirsute, hairy.
Hispid, covered with bristle-like hairs.
Hoary, clothed with a grey or white down.
Homogamous, all the flowers hermaphrodite.
Homogynous, all the flowers female.
Hooded, hollowed into the form of a hood.
Hypogynous, situated below the ovary.

I.

Imbricate, laid over each other like tiles.
Imparipinnate, pinnate leaves, terminating with an odd leaflet.
Incumbent, lying open.
Indehiscent, not opening naturally.
Induplicate, doubled or folded inwards.
Indurate, hard.
Inflated, puffed up, blown out like a bladder.
Inflorescence, disposition of the flowers.
Infra-axillary, below the axils of the leaves.
Infra-stipular, below the stipules.
Internodes, the space between the joints in the stems.
Interpetiolar, between the petioles or leaf-stalks.
Introrse, turned inwards.
Inverted, upside down.
Involucel, a small involucre.
Involucre, two or more bracts united below the flower.

J.

Jagged, coarsely cut.
Jointed, having joints or articulations.

K.

Keel, the lower petals of a papillonaceous flower, a resemblance to the keel of a boat either in leaves or flowers.
Keel-shaped, having a keel-like appearance.
Kneed, bent like the knee joint.

L.

Labiate, having a lip or lips.
Lamellate, divided into thin plates.
Lamelliform, shaped like the gills on the under side of a mushroom, and similar fringe.
Lamina, the upper spreading part of a flower.
Lanceolate, lance or spear-shaped.
Lanceolate-elliptic, a form between lance-shaped and elliptic or oval.
Lanceolate-oblong, lance-shaped and oblong.
Lanceolate-ovate, between lance-shaped and egg-shaped.
Lanceolate-subulate, between lance-shaped and awl-shaped.
Lateral, on the side or sides.
Lax, loose.
Leaflet, a small leaf, forming part of a compound leaf.
Legume, a pod, the fruit of leguminous plants.
Lepidoted, having prominent dots.
Ligneous, woody, a term opposed to herbaceous.

GLOSSARY.—*Continued.*

Ligulate, strap-like, having the form of a strap.

Limb, the spreading part of a petal, or of a tubular flower.

Linear, narrow, when the two sides are nearly parallel.

Linear-cuneate, between linear and wedge-shaped.

Linear-elliptic, narrow and elliptic.

Linear-lanceolate, narrow lance-shaped.

Linear-oblong, between linear and oblong.

Linear-setaceous, narrow, approaching to the form of a bristle.

Linear-subulate, narrow and tapering to a point.

Lineate, streaked in parallel lines.

Lip, the lower projecting petal of an irregular flower.

Lobe, the segment of a divided leaf.

Loculicidal, admitting the escape of the seeds through the valves.

Loment, a kind of pod which when ripe falls in pieces at the joints.

Lucid, shining.

Lunulate or ***Lunate***, half-moon shape.

Lyrate, a leaf is lyrate when its apex is rounded, and there are several small lateral lobes toward its base; harp or lyre-shaped.

M.

Membranous, of a thin pliable texture.

Metamorphosed, changed from one form to another.

Monadelphous, having the filaments united at the bottom into one bundle or brotherhood.

Moniliform, formed like a necklace, having alternate swellings and contractions.

Monœcious, having the stamens and pistil in separate flowers on the same plant.

Monopetalous, having but one petal, or having the petals united so as to appear as one.

Monospermous, one-seeded.

Mucilaginous, of a slimy or gummy nature.

Mucro, a sharp rigid point

Mucronate, terminate in a spine, or mucro.

Mucronate-cuspidate, tapering suddenly to a point which is tipped with a mucro or spine.

Mucronate-denticulate, toothed, each tooth terminating with a sharp point.

Mucronulate, terminating in a small hard point.

Multifid, many cleft.

Muricate, covered with short sharp points.

Mutic, pointless, a term opposed to mucro.

N.

Navicular, boat-shaped.

Nectariferous, having nectaries, bearing honey.

Nectary, a part of the corolla, for the most part bearing honey.

Nucleus, the kernel of a nut.

Nut, a seed enclosed within a hard shell.

Nutant, nodding.

O.

Obconical, inversely cone-shaped.

Obcordate, inversely heart-shaped.

Obcuneate, wedge-shape inverted.

Oblate, flattened.

Oblique, not direct or parallel.

Oblong, two or three times longer than broad.

Oblong-acute, oblong and sharp pointed.

Oblong-cuneated, between oblong and wedge-shaped.

Oblong-lanceolate, between oblong and lance-shaped.

Oblong-linear, in form between oblong and linear.

Oblong-oval, a form between oblong and oval.

Obovate-cuneated, between oval and wedge-shaped, with the broadest end uppermost.

Obovate-lanceolate, between egg-shaped and lance-shaped inverted.

Obovate-spathulate, between obovate and that of a spatula.

Obsolete, hardly evident.

Obtuse, blunt.

Octandrous, having eight stamens.

Opaque, not reflecting light, not transparent.

Opposite, placed in pairs on opposite sides of the stem.

Orbicular, circular, spherical.

Oval, in the form of an ellipse.

Ovary or ovarium, the germen, or incipient seed vessel which contains the rudiments of the future seed.

Ovate-acuminate, egg-shaped in the lower part and tapered to a point.

Ovate-acute, egg-shaped in part, but terminating in a sharp point.

Ovate-campanulate, between egg-shaped and bell-shaped.

Ovate-elliptic, between ovate and elliptical.

Ovate-globose, between round and egg-shaped.

Ovate-lanceolate, between egg-shaped and lanceolate.

Ovoid, egg-shaped.

Ovoid-cylindrical, between egg-shaped and cylindrical.

Ovulum, an incipient seed.

P.

Palmate, palm-shaped, divided so as to resemble the hand spread open.

Panduriform, fiddle-shaped.

Panicle, a loose irregular mode of inflorescence, similarly disposed to that of oats.

Papillionaceous, butterfly-shaped flowers, as those of the common peas.

Papilliform, bearing resemblance to small glandular excresences or pimples.

Pappose, downy, having pappus.

Pappus, a kind of down formed by the minute divisions of the limb of the calyx of the Compositæ.

Parietal, attached to the sides or walls of the ovary.

Pectinate, comb-shaped.

Pedicel, the flower stalk of each separate flower.

Pedicellate, having pedicels.

Peduncle, the principal flower stalk.

Pedunculate, having peduncles.

Pellucid, transparent, bright.

Peltate, a peltate leaf has the petiole fixed in the centre of the disk, instead of in the margin.

Pendulous, drooping, hanging down.

Pentagonal, five-angled.

Pentandrous, having five stamens.

GLOSSARY.—*Continued.*

Pentapetalous, five-petaled.

Perfoliate, a leaf is said to be perfoliate when the stem passes through its base, as in the honey-suckle.

Perforated, pierced through, apparently full of holes.

Perianth, the flower cup, the envelope which surrounds the flower; a term applied when the calyx cannot be distinguished from the corolla.

Pericarp, the covering of the seed vessel.

Perigynous, inserted in the calyx, or in the disk that adheres to the calyx.

Persistent, remaining, not falling off.

Petal, a division of a corolla.

Petiolate, having petioles or footstalks to the leaves.

Petiole, the footstalk of a leaf.

Petiolule, the footstalk of a leaflet.

Pilose, hairy.

Pinnæ, the leaflets of a pinnate leaf.

Pinnate, a leaf divided into many smaller leaves or leaflets is said to be pinnate.

Pistil, the columnar body usually situated in the centre of a flower, when perfect it consists of the ovary, the style, and the stigma.

Placenta, that part of the seed-vessel to which the seeds are affixed.

Plano-convex, flat on one side, and convex on the other.

Plicate, plaited.

Plumose, feathery, bearing a resemblance to feathers.

Plumule, the ascending shoot of a seedling.

Pod, a kind of seed-vessel, similar to that of the common pea.

Pollen, farina or dust contained within the cells of the anthers when perfect, it is essential to fructification.

Polyandrous, having more than twenty stamens inserted in the receptacle.

Polygamous, producing male, female, and hermaphrodite flowers on the same plants.

Polypetalous, having many petals.

Procumbent, prostrate.

Puberulous, clothed with spreading down.

Pubescent, covered with short soft hairs.

Punctured, dotted.

Putamen, a nut of many cells.

Pyriform, shaped like a pear.

Q.

Quadrangular, having four angles.

Quadrifarious, arranged in four rows or ranks.

Quadrifid, four-parted, divided into four parts.

Quinquefid, five-parted, divided into five parts.

R.

Raceme, a mode of infloresence in which the flowers are arranged around a simple filiform axis, each particular flower on its own proper footstalk.

Rachis, the common footstalk of spikes or panicles of flowers, and of compound leaves.

Radiant, divided like the rays of a star.

Radicle, the root of the embryo.

Ramose, branched.

Receptacle, that part of the fructification which supports the other parts.

Recurved, curved backwards.

Reflexed, bent backwards.

Reniform, kidney-shaped.

Repand, when the margin of a leaf has a very undulated appearance.

Replicate, folded back.

Reticulated, net-like, usually applied to the veins or nerves.

Retuse, ending in a broad shallow notch.

Revolute, rolled back.

Rhomboid, a figure approaching to a diamond shape.

Rigid, stiff.

Rotate, wheel-shaped, a monopetalous corolla having a very short tube and a flat limb, is called rotate.

Rufescent, somewhat rusty.

Rugose, rough or coarsely wrinkled.

Runcinate, cut into several transverse acute segments which point backwards.

S.

Sagittate, arrow-shaped.

Samara, a kind of winged seed-vessel containing one or more seeds surrounded, or partially surrounded, by a thin transparent membrane.

Sarmentose, producing trailing stems which root at every joint.

Scabrous, rough from little asperities.

Scale, a term usually applied to the bracteæ of the catkin.

Scaly, having scales.

Scandent, climbing.

Scape, a stem rising immediately from the roots, bearing flowers only, or, at most, flowers and a few bracteæ.

Scarious, dry and membranous.

Secund, arranged on one side only.

Semi, half.

Seminiferous, seed-bearing.

Sepals, divisions of the calyx.

Septicidal, dividing at the dissepiments to admit the escape of seeds.

Serrate, like the teeth of a saw.

Serrulate, finely notched like the teeth of a very fine saw.

Sessile, without stalks.

Seta, a bristle, a stiff strong roundish hair.

Setaceous, resembling a bristle in form.

Setigerous, bearing bristles.

Setose, bristly; clothed with bristles.

Sheath, the lower part of a leaf or petiole which surrounds the stem.

Sinuated, cut into scollops.

Sinus, a notch or cavity.

Spathulate, shaped like a spatula.

Spicate, having an infloresence in which the flowers are sessile or nearly so, upon one long common footstalk.

Spine, a thorn which proceeds from the wood, not from the bark only.

Spinescent, furnished with spine-like processes.

Spinule, a small spine.

Spurred, having horn-like processes, produced by various parts of a flower.

GLOSSARY.—*Continued.*

Squarrose, ragged, scurfy.
Stamen, the male organ of a flower.
Staminodia, scales at the base of the petals in some flowers, as in those in some species of lime.
Standard, the upper petal in papilionaceous flowers.
Stellate, radiating in a star-like manner.
Stem-clasping, the petiole of a leaf which is dilated so as to enfold the stem with its base, is said to be stem-clasping.
Stipe, the stalk of the ovary within the corolla and calyx.
Stipitate, furnished with a stipe.
Stipule, a small leaf, or membrane at the base of the petiole.
Stipulate, having stipules.
Stoloniferous, bearing runners that root at the joints.
Stomata, pores of the epidermis.
Striated, streaked.
Strigose, covered with little, upright stiff hairs.
Style, that part of the pistil which is situated upon the ovary, and elevates the stigma.
Sub, somewhat, as sub-rotund, somewhat rounded.
Suffruticose, rather shrubby.
Sulcate, furrowed.
Surculi, young shrubs, suckers.
Surculose, producing surculi, or young shoots.
Suture, the line formed by the cohesion of two parts, usually applied to the fruit.

T.

Tendrils, the twining organs by which some plants lay hold of others, as the vine.
Terete, long and round, straw-like.
Terminal, at the end.
Ternary, consisting of threes.
Ternate, a leaf of three leaflets is called ternate.
Testa, the shell or cuticle of a seed, containing all its parts.
Tetragonal, four-angled.
Tetragonous, having four angles.
Thyrsus or Thyrse, a mode of inflorescence in a dense or close panicle, as in the lilac.
Thyrsoid, resembling a Thyrse.
Tomentum, down, white hairs closely matted together, and soft to the touch.
Toothed, so divided as to resemble teeth.
Top-shaped, inversely conical, having a contraction towards the point.
Tortuous, twisted.
Torus, the receptacle when somewhat elevated.
Trichotomous, branches dividing into threes.
Trifid, three-cleft.
Trifoliate, having three leaves.
Trifoliolate, having three leaflets.
Trigonal, three-angled.
Trigynous, having three styles.
Triquetrous, three-sided.
Truncate, blunt, as if cut off.
Tube, the cylindrical part of a flower.
Tubercle, a little knob.
Tuberculate, covered with little knobs.
Tufted, forming a dense tuft.
Tumid, swelling.
Turbinate, top-shaped.
Turgid, puffed up; swollen.

U.

Umbellate, having the flowers in round flat heads, the flower stalks proceeding from one common centre.
Umbellule, a small umbel, a division of an umbel.
Umbilicate, hollowed like the navel.
Umbilicus, the cord which attaches the seed to the placenta.
Undulate, waved.
Unguiculate, furnished with a claw, as the petals of the pink.
Urceolate, pitcher-shaped.
Utricle, a little bladder.

V.

Valvate, opening by valves.
Valvular, consisting of valves.
Velvety, covered with a soft down-like velvet.
Vernation, the disposition of the young or growing leaves within the bud.
Verrucose, warted.
Versatile, vane-like, an anther fixed in the centre on the point of the filament, so as to be continually changing its position, is said to be versatile.
Verticel, a mode of inflorescence in which the flowers surround the stem in a kind of ring, though not, perhaps, inserted on all sides of it, but merely on two opposite ones.
Verticillate, growing in whorls round the stem.
Vexillum, the standard or banner (the upper petal) of a pea flower.
Villous, clothed with soft, close, loose hairs.
Viscid, or *Viscous*, clammy, adhesive.
Vittæ, longitudinal ducts or canals, containing an oily or resinous substance, found within the carpels of some umbelliferous plants.

W.

Wedge-shaped, inversely triangular, with rounded angles.
Whorl, a disposition of leaves or flowers round the stem resembling the spokes round the nave of a wheel.
Wing, a membranous border, a membrane attached to some kind of seeds, by which they are supported in the air when floating from place to place.
Winged, furnished with a wing or wings.
Woolly, covered with hairs, closely matted together.
Wrinkled, having an unequal surface.

Z.

Zigzag, bending from side to side.

SYSTEMATIC, MAORI AND SETTLERS' NAMES OF PLANTS

DESCRIBED IN THIS WORK, WITH SEASONS OF FLOWERING.

Maori Name.	Settlers' Name.	Systematic Name.	Description.	Season of Flowering.
		A.		
Aka	Myrtle	Metrosideros scandens	Climber	January–February
Akakura	„	„ „	„	„ „
Ake-ake	Lignum vitæ	Dodonea viscosa	Small tree	September–October
Ake-rautangi	„ „	„ „	„	„ „
		H.		
Hauama	Cork-wood	Entelea arborescens	Small tree	October–November
Hinau	Hinau	Elœocarpus dentatus	Tree	November–December
„	Small Hinau	„ Hookerianus	„	„ „
Hinahina	Whitewood	Melicytus ramiflorus	Small tree	November–January
Horopito	Peppertree	Drimys axillaris	„	November–December
Hohere	Lace-bark	Plagianthus Lyallii	„	February–March
Houi	Ribbon-wood	Hoheria populnea	„	November–December
Hutiwai	Burr	Acœna sanguisorbæ	Herb	November–January
Hutukawa	Christmas tree	Metrosideros tomentosa	Tree	December–January
		K.		
Kahikitoa	Tea-tree	Leptospermum scoparium	Shrub	Throughout the year
Kaho	Flax	Linum monogynum	Herb	November–December
Kamai	Birch	Weinmannia racemosa	Tree	„ „
Kamahi	„	„ „	„	„ „
Kaikomako	Kaikomako	Pennantia corymbosa	Small tree	December–January
Karaka	Karaka	Corynocarpus lœvigata	Tree	October–November
Karo	Turpentine tree	Pittosporum crassifolium	„	„ „
Kohe-kohe	Cedar	Dysoxylum spectabile	„	June–July
Kohukohu	Kohukohu	Pittosporum obcordatum	Small tree	October–November
Kowhiwhi	Kowhiwhi	Pittosporum tenuifolium	„	November–January
Kopata	Pelargonium	Pelargonium Australe	Herb	November–December
„	Avens	Geum urbanum	„	November–January
Kowhai	Yellow Kowhai	Sophora tetraptera	Tree	September–October
Kowhai-ngutu-kaka	Crimson Kowhai	Clianthus puniceus	Shrub	October–November
		M.		
Mahoe	Whitewood	Melicytus ramiflorus	Small tree	November–January
Maire-Tawake	Maire Tawhake	Eugenia maire	„	April-May
Mairehau	Mairehau	Phebalium nudum	Shrub	October–November
Makamaka	Ackama	Ackama rosœfolia	Small tree	November–December
Maukoro	Broom	Carmichœlia Australis	Shrub	„ „
Makaka	„	„ „	„	„ „
Makomako	Wine-berry	Aristotelia racemosa	Small tree	September–October

SYSTEMATIC, MAORI & SETTLERS' NAMES OF PLANTS.—*Continued.*

Maori Name.	Settlers' Name.	Systematic Name.	Description.	Season of Flowering.
		M. *continued.*		
Manuka	Tea-tree	Leptospermum scoparium	Shrub	Throughout the year
„	„	„ ericoides	Tree	November–December
Maupariki	Kowhiwhi	Pittosporum tenuifolium	Small tree	November–January
Matuakumara	Geranium	Geranium dissectum	Herb	„ „
		N.		
Nau	Scurvy weed	Lepidium oleraceum	Herb	...
		P.		
Panapana	Cress	Cardamine hirsuta	Herb	September–January
Patete	Patete	Melicope ternata	Small tree	September–October
Pikiarero	Clematis	Clematis hexasepala	Climber	September–November
Pinakitere	Geranium	Geranium dissectum	Herb	November–January
Piripiri	Burr	Acœna sanguisorbæ	„	„ „
Piripiri-kahu	Burr	Acœna sanguisorbæ	„	„ „
Piripiri	Piripiri	Pittosporum cornifolium	Shrub	„ „
Piripiriwhata	Puta-puta	Carpodetus serratus	„	October–December
Pohutukawa	Christmas tree	Metrosideros tomentosa	Tree	December–January
Pokonuiahuru	Small Clematis	Clematis parviflora	Climber	November–December
Putaputa-weta	Puta-puta	Carpodetus serratus	Shrub	October–December
Puawananga	Large Clematis	Clematis indivisa	Climber	October–November
		R.		
Ramarama	Ramarama	Myrtus bullata	Shrub	December–February
Rata	Rata	Metrosideros robusta	Tree	December–January
Rata-piki	„	„ florida	„	January–June
Rauhuia	Flax	Linum monogynum	Herb	November–December
Rawiri	Tea tree	Leptospermum ericoides	Tree	„ „
Rohutu	Rohutu	Myrtus obcordata	Shrub	„ „
		T.		
Tarata	Lemon wood	Pittosporum Eugenioides	Tree	November–December
Tataramoa	Bramble	Rubus Australis	Shrub	„ „
Tauhinu	Tauhinu	Pomaderris phylicifolia	„	„ „
Taweku	Tutu	Coriaria ruscifolia	„	November–January
Tawari	Tawari	Ixerba brexioides	Small tree	June–July
Tawhero	Birch	Weinmannia racemosa	Tree	November–December
Titoki	Titoki	Alectryon excelsum	„	October–November
Titongi	„	„ „	„	„ „
Toatoa	Toatoa	Haloragis alata	Herb	October–January
Toii	Cress	Barbarea Australis	„	November–December
Torotoro	Myrtle	Metrosideros scandens	Climber	January–February
Tupakihi	Tutu	Coriaria ruscifolia	Shrub	November–January
Tutu	Tutu	Coriaria ruscifolia	„	„ „
Tutupapa	Ground Tutu	„ thymifolia	Herb	„ „
		W.		
Whakaka	Broom	Carmichœlia Australis	Shrub	November–December
Whauwhi	Ribbon wood	Plagianthus Lyallii	Small tree	February–March
„	„	„ betulinus	„	November–December
Wharangi	Wharangi	Melicope ternata	„	September–October
Whau	Cork-wood	Entelea arborescens	„	October–November
Whawhako	Maire Tawhake	Eugenia maire	„	April–May
Whinau	Hinau	Elœocarpus dentatus	Tree	November–December

LIST OF SUBSCRIBERS TO THE AUTHORS' EDITION.

HIS EXCELLENCY SIR W. F. D. JERVOIS, G.C.M.G., C.B.

A

Adair, Wm., Esq., Gisborne
Adams and Sons, Messrs., Christchurch
Agricultural and Pastoral Association, Christchurch
Allen, F., Esq., Wellington
Alexander, Jno., Auckland
Andrew, Capt., Gisborne
Armstrong, Wm., Esq., Gisborne
Atkinson, Sir H. A., K.C.M.G., Wellington

B

Baber, Jas., Jun., Esq., Auckland
Baker, Mrs. J. G., Gisborne
Barker, W. E. Esq., Rangitata
Barstow, R. C., Esq., Auckland
Bayley, P., Esq., Normanby
Beatson, J., Esq., Meanee
Bell, H. Dillon, Esq., Wellington
Bell, J. U., Esq., Napier
Bennett, W. E., Esq., Auckland
Bennett, C. D., Esq., Gisborne
Best, W., Esq., Wellington
Blades, Jos., Esq., Auckland
Bloomfield, W. R., Esq., Auckland
Blythe, J. G., Esq., Auckland
Booth, Jas., Esq., R.M., Gisborne
Bourke, Jno., Esq., Gisborne
Bourke, P. H., Esq., Gisborne
Bowden, A., Esq., Kaikora
Bower, W. N., Captain, Napier
Buchanan, W. C., Esq., M.H.R., Wairarapa
Buchanan, Jno., Esq., F.L.S., Dunedin
Buddle, Thos., Esq., Auckland
Bull, H., Esq., Gisborne
Burgess, J., Esq., Auckland
Brandon, A. DeB., Esq., Wellington
Bremner, C. G., Esq., Masterton
Brown, W. H., Esq., Napier
Brown, E. K., Esq., Gisborne
Brooking, Jno., Esq., Gisborne
Brookfield, F. W., Esq., Auckland
Brownhill, Jas., Esq., Wagga-Wagga, N.S.W.
Bruford, C. A., Esq., Newmarket

C

Campbell, A. B., Esq., Wellington
Canterbury College, Christchurch
Carr, E., Esq., C.E., Napier
Card and Rabone, Messrs., Blenheim
Carrol, T., Esq., Wairoa
Cartney, A. M., Esq., Wellington
Caulton, H. O., Esq., Hastings
Cato, J. G., Esq., Napier
Cave, C. W., Esq., Auckland
Chambers, W. K., Esq., Gisborne
Chapman, M., Esq., Wellington
Cheeseman, T. F., Esq., F.L.S., Auckland
Clapham, G. J., Esq., Wellington
Clark, J. M., Esq., Auckland
Coleman, Jno., Esq., Gisborne
Conolly, Jno., Esq., Blenheim
Conway, E., Esq., Napier
Cooper, A. M., Esq., Wellington
Cotter, Thos., Esq., Auckland
Cox, J. D., Esq., Featherston
Crawford, H. D., Esq., Wellington
Crawford, W. F., Esq., Gisborne

D

Dall, Jas., Esq., Collingwood
D'Enys, J., Esq., Christchurch
De Lautour, Dr. H. A., M.D., Oamaru
Dickson, T. J., Esq., Gisborne
Dignan, P., Esq., Auckland
Dixon, J. J., Esq., Auckland
Dobson, D., Esq., Blenheim
Douglas, Wm., Esq., Napier
Dunn, Jas., Esq., Wellington
Dumergue, E. P., Esq., Opotiki

E

East, Jas., Esq., Gisborne
Education Department (20 copies)
Edwards, J. C., Esq., Wellington
Evans, T. S., Esq., Auckland

F

Featon, J., Esq., Auckland
Featon, E. D., Esq., Southsea, England
Ferguson, W., Esq., Wellington
Field, H. C., Esq., Wanganui
File, W. L., Esq., Gisborne
Finn, H. J., Esq., Gisborne
Finneran, W. P., Esq., Gisborne
Foster, Geo., Esq., Gisborne
Fox, Rev. J. E, Gisborne
Fraser, Miss, Sydney, N.S.W.

G

Gannon, M. J., Esq., Gisborne
Gardiner, W., Esq., Ngapara
Gawith, C. F., Esq., Masterton
General Assembly Library, Wellington
George, J. R., Esq., Wellington
Gifford, T. H., Napier
Gifford, A. C., Oamaru
Gillies, His Honour Mr. Justice, Auckland
Gilmer, H., Esq., Wellington
Given, A., Esq., Dunedin
Glendinning, R., Esq., Dunedin
Grace, Rev. T. S., Blenheim
Graham, A., Esq., M.H.R., Gisborne
Grant, A., Esq., Takapau
Grant, A., Esq., Dunedin
Gray, J., Esq., Wellington

H

Haggitt, B. C., Esq., Dunedin
Hall, T., Esq., Auckland
Hanna, T. H., Esq., Blenheim
Hamilton, A., Napier
Harcourt, J. B., Esq., Wellington
Hardy, H. F., Esq., Dunedin
Harris, E. F., Esq., Gisborne
Henderson, L., Esq., Melbourne, Victoria
Hesketh, S., Esq., Auckland
Higgins, L., Esq., Puketapu
Hill, H., Esq., Inspector of Schools, Napier
Hosking, W. W., Esq., Masterton
Howard, C. C., Esq., Blenheim
Hulke, C., Esq., Wellington
Hunt, W., Esq., Wellington

I

Innes, Dr. F., M.D., Napier
Innes, Dr. J. F., M.D., Gisborne
Isitt, Rev. S. M., Wellington

J

Johnson, Hon. G. R., M.L.C., Wellington
Johnson, J. Woodbine, Esq., Gisborne (two copies)
Johnston, J., Esq., Auckland
Johnston, W. H., Esq., Wellington
Johnston, C. J., Esq., Wellington
Johnston, D., Jun., Esq., Gisborne
Johnston, H. E., Esq., Gisborne
Jones, F., Esq., Gisborne

K

Kaye, M., Esq., Masterton
Kebbell, Mrs. J., Wellington
Keefer, A., Esq., Gisborne
Keith, J. B., Esq., Masterton
Kempton, W. T., Esq., Dunedin
King, J. Whitely, Esq., Wellington
Kinross, J. G., Esq., Napier
Kirk, Professor T., F.L.S., Wellington
Knight, E. R., Esq., Christchurch

L

Lamb, Thompson, Esq., Dunedin
Large, J. T., Esq., Wairoa
Lennox, J. M., Esq., Auckland
Levin, Mrs. W. H., Wellington
Liggins, C. J., Esq , Blenheim
Locke, S., Esq., Gisborne
Loisel, H., Esq., Gisborne
Loudon, R., Esq., Gisborne
Loudin, F., Wellington

M

Mackenzie, Thos., Esq., M.H.R., Balclutha
Maude, Wm., Esq., Gisborne
Martin, R., Esq., Wellington
Martin, D., Esq., Wellington
Maxwell, Mrs. J. P., Wellington
Meredith, C. K., Esq., Masterton
Macdonald, T. K., Esq., Wellington
McDonnell, D. G., Esq., Auckland
McKerrow, Jas., Esq., F.R.G.S., Wellington
McKenzie, Jas., Esq., Wellington
McKenna, Rev. Father, Wellington
McNamara, J., Vicar-General, Wellington
Mitchelson, E., Hon., M.H.R., Wellington
Monteith, H., Esq., Napier
Moorhouse, W. H. S., Esq., Wellington
Morison, C. B., Esq., Wellington
Murphy, J., Rev. Father, Gisborne

N

Newman, A. B., Esq., Gisborne
Nicols, J., Esq., Wellington
Nimmo and Blair, Messrs., Dunedin

O

Orr, D. M., Esq., Gisborne
O'Ryan, Wm., Esq., Gisborne
Osmond, C. H., Esq., Auckland

P

Papworth, D. S., Esq., Masterton
Parker, John, Esq., Christchurch
Parris, W. J., Esq., Gisborne
Pharazyn, Mrs., Wellington
Pickett, J. E., Esq., Gisborne
Pilcher, H. C., Esq., Wellington
Pollen, C. R., Esq., Auckland
Pollen, Dr. H., M.D., Gisborne
Porter, Thos., Major, Gisborne
Porter, Robt., Esq., London
Public Library, Auckland
Pringle, Thos., Esq., Wellington
Pryor, Jas. J., Dunedin
Pyke, Vincent, Esq. M.H.R., Dunedin

R

Rattray, J., Esq., Dunedin
Reid, R. H.. Esq., Auckland
Reynolds, Alf., Esq., Gisborne
Rhodes, Mrs. S. A., Wellington (2 copies)
Rhodes, R. H., Esq., Christchurch
Rhodes, Arthur, Esq., Christchurch
Riley, A. D., Esq., Master School of Arts, Wellington
Robjohns, Mrs., Gisborne
Robertson, P., Esq., Napier
Roydhouse, W. F., Esq., Wellington
Russell, Jas., Esq., Masterton

S

Scott, J. R., Esq , Gisborne
Sheriff, Bedford, Esq., Gisborne
Sievwright, Wm., Esq., Gisborne
Sinclair, W., Esq., Blenheim
Skinner, W. H., Esq., New Plymouth
Sloan, Jas., Esq., Wellington
Smith, Seth, Esq., District Judge, Auckland
Smith, S. P., Esq., F.R.G.S.. Auckland
Smythe, R. S., Esq., Melbourne
Suter, Right Reverend Bishop, Nelson
Spencer, F. H., Esq., Waipukurau
Stafford, E., Esq., Wellington
Staples, J., Esq., Wellington
Steele, C. M., Esq., Wellington
Stevens, F., Esq., Wellington
Stewart, Jas., Esq., C.E., Auckland
St. Mary's Convent, Wellington
Swan, G. H.. Napier

T

Tanner, Thos., Esq., Riverslea, H.B.
Tait and Miller, Messrs., Napier
Taylor, J. F., Esq., Wellington
Tharratt, W., Esq., Gisborne
Tiffen, H. S., Esq., Napier
Tole, J. A., Esq., Auckland
Townley, Jno., Esq., Gisborne
Tucker, W. H., Esq., Gisborne
Tully, Jno., Esq., Greytown
Tunks, Thos., Esq., Wairoa
Tregear, Ed., Esq., Wellington

U

Ure, A. R., Esq., Dunedin

V

Vallance, Miss, Masterton
Vautier, J. H., Napier

W

Wallace, Rev. A. H., Gisborne
Ward, Thos., Esq., Wellington
Wasteneys, Sir W., Bart., Auckland
Weetman, Sidney, Esq., Gisborne
Wetherby, D. W., Esq.. Auckland
White, W. K., Esq., Napier
White, Mrs. Janet, Auckland
White, A. J., Esq., Christchurch
Whitehouse, T., Esq., Wellington
Wilcox, H., Esq., Wellington
Wilson, Miss, London
Wilson, G. H., Esq., Gisborne
Wilkinson, T. M., Esq., Dunedin
Williams, E. H., Esq., Hastings
Williams, Mrs. Saml., Te Aute
Williams, H., Esq., Napier
Williams, W. L., Ven. Archdeacon (2 copies)
Williamson, H., Esq., Auckland
Wren, C. T., Esq., Auckland,
Wright, Jno., J., Esq., Dunedin